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**The Relevance of Autistic Traits to Sibling
Relationship Quality and Psychological Adjustment**

A thesis submitted for the degree of Doctor of Philosophy

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September 2010

I declare that this thesis is of my own composition, and that the material contained within describes my own work. It has not been submitted to another University for the award of any other degree.

Signature.....

Zoë Rose Wheeler

September, 2010

UNIVERSITY OF SUSSEX**Zoë Rose Wheeler****The Relevance of Autistic Traits to Sibling Relationship Quality and Psychological Adjustment.****Summary**

This thesis in part addressed a call by Hodapp, Glidden & Kaiser (2005) to focus on identifying potential mediators and moderators of the relationship between growing up with a sibling with an autism spectrum condition (ASC) and adverse outcomes such as poorer sibling relationship quality (SRQ) and adjustment problems. It attempted to clarify previous inconsistent findings in the literature by considering autism as a dimensional disorder (with traits present on a continuum between the general population and those on the higher end reaching a clinical cut-off for diagnosis of ASC) and focusing on the autistic traits of (mainly) older siblings in a dyad. Specifically, these related to attention to detail, impaired mind reading ability, impaired social skills and impaired imagination. In addition, when looking at families with an ASC child, using a relatively homogenous sample group of typically developing younger siblings (YS) in middle childhood controlled for factors that potentially influenced past mixed findings. Hypotheses were extended to an analogous sample of young adults by asking dyads for both retrospective and current (adult) SRQ and self reported autistic traits. Themes emerging from the actual lived experiences of typically developing younger siblings of children with autism were also considered, and highlighted a number of difficulties faced by these siblings. The quantitative findings indicate that different elements of the social and communication

domains relate to negativity compared to positivity in SRQ, and that there is a significant relationship between attention to detail (i.e. the non-social domain) and typical YS adjustment but not between YS adjustment and the social and communication domains. For young adults, reports of higher impairments in imagination were associated with retrospective reports of lower positivity in SRQ, and level of attention to detail was significantly associated with rivalry in adult SRQ. Overall these findings indicate that different autistic traits should be considered as separate influences on SRQ and adjustment.

Table of Contents

Summary	3
Table of contents	5
List of Tables	9
Acknowledgements	10
1. Motivation and outline of thesis	12
2. Background: Individuals with autism spectrum conditions (ASC)	13
2.1. The narrow and broad autism phenotypes	14
2.2. Measuring autistic traits	15
2.3. How ASC impairments manifest	16
3. Theoretical approaches for understanding the potential impact of ASC on families:	20
Relational and family systems	
4. Sibling relationships- the sibling relationship quality	22
4.1. Sibling relationships in families with a disabled child	23
4.2. Sibling relationships in families where one child has ASC	24
4.3. Assessing SRQ	28
4.4. Qualitatively exploring SRQ	29
4.4.1. Qualitative reports of parents with children with ASC	29
4.4.2. Children's reports of sibling relationships	30
4.4.3. Children's reported experiences with ASC siblings	31
4.4.4. Interpretive Phenomenological Analysis	32
4.4. Sibling relationship quality of young adults	32
4.5. Retrospective SRQ	35
5. Psychological adjustment during childhood	35
5.1. Links between adjustment and SRQ	36

5.2. Adjustment of siblings of children with disabilities	37
5.3. ASC sibling adjustment	38
5.3.1. Explaining mixed findings	42
5.3.2. Is SRQ associated with the adjustment of ASC siblings?	44
6. Aims and hypotheses	46
7 Outline of studies	49
8. Research articles	
Article 1: “I wish he would play with me more”: Children's reports on the experience of growing up with a sibling who has an autism spectrum condition	53
Theoretical background	54
Method	58
Results and discussion	63
Summary and conclusions	78
Article 2: Are different observable autistic traits linked to positivity and negativity in sibling relationship quality?	82
Theoretical background	83
Method	86
Results	89
Discussion	97
Article 3: Brief report: How autistic traits relate to current and retrospective sibling relationship quality among young adults in the general population	103
Theoretical background	104
Method	106
Results	109
Discussion	115

Article 4: Links between adjustment, autistic traits and sibling relationship quality for ASC siblings	118
Theoretical background	119
Method	124
Results	128
Discussion	136
9. General discussion	141
9.1. Sibling relationship quality in families with an older ASC sibling	142
9.2. Adjustment of TD younger sibling in families with ASC	143
9.3. Qualitative experiences	143
9.4. Mediating and moderating factors in determining SRQ and YS adjustment	144
9.4.1. Impaired imagination	145
9.4.2. Impaired social skills	146
9.4.3. Impaired mind reading	146
9.4.4. Attention to detail	147
9.5. Considering SRQ and YS adjustment in ASC families	148
9.6. The dimensional view of ASC	149
9.7. Similarity and difference in AQ traits	150
9.8. Strengths and limitations and future directions	151
9.9. Potential clinical implications	154
9.9.1. TD siblings of children with ASC	154
9.9.2. Children with ASC	155
9.10. Sibling relationships and autistic traits in the general population	156
9.11. General Conclusions	156

References	158
Appendix	177

List of Tables

Article 2	Table 1	Mean (with SD) for age, AQ and SRQ positivity and SRQ negativity, and for older and younger siblings on AQ subscales.	87
	Table 2	Across and within family group correlations.	90
	Table 3	Standardised beta weights for multiple regression analyses testing for AQ trait mediation and positivity	93
	Table 4	Standardised beta weights for multiple regression analyses testing for AQ trait mediation and negativity	94
Article 3	Table 1	Mean (with SD) for retrospective (RSRQ) and current (dyadic) (ASRQ) sibling relationship quality and older and younger sibling self-reported autistic traits.	110
	Table 2	Correlations between retrospective (RSRQ) and current (dyadic) (ASRQ) sibling relationship quality and older and younger sibling self-reported autistic traits	
Article 4	Table 1	Mean (with SD) for all study measures by family type: Higher AQ scores indicate higher degrees of impairment.	125
	Table 2	Correlations between adjustment scales, AQ subscales and positivity and negativity in SRQ	127
	Table 3	Standardised beta weights for multiple regression analyses testing for mediation and younger sibling adjustment difficulties	129
	Table 4	Multiple regression analysis testing older sibling attention to detail (OSAD) as a moderator of family type and younger sibling emotional symptoms.	131

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1. Motivation and outline of thesis

Autism spectrum conditions (ASCs) represent a challenge to any family environment, particularly for typically developing (TD) children growing up with a sibling who has ASC. Research into siblings of children with a disability is an under-developed field (Hodapp, Glidden & Kaiser, 2005). Siblings are sources of support, amusement and fun, as well as frustration and irritation for each other. They offer a way for children to develop cognitively and socially by showing children that other people have different points of view and desires, and hence the presence of siblings helps children learn ways to resolve confrontations, adapt their own point of view, learn, and imitate behaviours (Brody, 1996; Dunn, 1988). When a child has an ASC, they exhibit varying degrees of impairment in three main areas (the triad of impairments). These include impairments in social and communication skills, as well as stereotyped and rigid behaviour patterns and interests (American Psychiatric Association, 1994). Dyadic processes between two people involve joint action patterns, which in turn impact on the closeness of the relationship, and each individual involved (Hartup & Laursen, 1991). Under certain conditions and circumstances, close relationships can have both a moderating and mediating effect on developmental outcomes (Hartup & Laursen, 1991). Considering a family context where one child has an ASC means there is a typically developing sibling growing up with a brother or sister who does not think or act “typically”. It is an experience that is likely going to be substantially different to the majority of the general population’s experiences of sibling-ship. A look at the current literature on siblings of those with ASC presents somewhat contradictory findings as to whether there is a risk for these children of negative outcomes (Orsmond & Seltzer, 2009). The present thesis aimed to investigate differences in sibling relationship quality and adjustment of typically

developing younger siblings with reference to specific autistic traits of the older child in the dyad. It also extended this to an analogous sample of young adults, and focused on the positive and negative experiences expressed by siblings of children with ASC.

2. Individuals with Autistic Spectrum Conditions (ASC)

Autism is classified as a pervasive developmental disorder (American Psychiatric Association, 1994). It affects up to 94 per 10 000 children, depending on how strict the classification criteria being used are (Baron Cohen et al., 2009). Autism spectrum conditions (ASC), sometimes referred to as autism spectrum disorders (ASD), is a term used to encompass not only classic autism as first described by Kanner (1943) but also Asperger's syndrome (AS) and pervasive developmental disorder not otherwise specified (PDD-NOS). PDD is more commonly used as a diagnostic category in the United States. There has been a marked increase in rates of diagnosis of ASC over the last twenty years (Baron Cohen et al., 2009), and popular awareness of the condition and basic understanding of what it might entail in terms of someone's behaviour is subsequently growing. This means that children in particular are more likely to be exposed to a person known to have an ASC, for example, in the classroom or within the family environment.

ASCs are usually identified during childhood; with parents often asserting retrospectively that they “always thought” there was something different about their child (Hutton & Caron, 2005). Diagnosis often takes place before the child has reached school age, and is much more common amongst males than females (4.3:1) (Newschaffer et al., 2007). When a child presents with ASC they are usually showing a number of different impairments in the domains of social and communication difficulties, and stereotyped and repetitive behaviours (American Psychiatric

Association, 1994). For diagnosis a child must present with some aspects from all three components of this triad of impairments. These vary widely in presentation, with it being said that no two children with ASC present with exactly the same symptoms and characteristics, and hence all ASCs represent variations in manifestation of the triad (Ronald et al., 2006). When impairments are severe but not quite in line with criteria for classic autism the diagnosis will usually be that of PDD. Children diagnosed with AS as opposed to autism are nearly always of average or above average IQ and spoke “on time” relative to their peers, whereas children with autism itself are usually abnormally delayed in initial production of speech and learning to talk (Baron-Cohen et al., 2009).

Although the exact aetiology of ASCs is unknown, most are thought to be largely genetic in origin (Rutter, 2000). Different genetic abnormalities may be responsible for each of the triad of impairments and attempting to identify a single cause for autism is an unrealistic and unobtainable aim (Ronald et al., 2006). Additionally, it is thought that each on the triad of impairments should be viewed as dimensions rather than discrete categories (Ronald et al., 2006). At a behavioural level, the distribution of traits supports the idea of a smooth continuum between the general population and individuals reaching diagnostic criteria for ASC, and there are modest correlations between the triadic areas both for people with ASC and the general population (Happé, Ronald & Plomin, 2006).

2.1 The narrow and broad autism phenotypes

As explained, the triad of impairments characterising ASC involves difficulties in social development, difficulties in the development of communication and strong, narrow interests or repetitive behaviour. The “narrow autism phenotype”

is a term to describe an individual with impairments in all three areas of the triad- difficulties in social and communication skills as well as rigid/repetitive behaviour and interests, and one who would receive a diagnosis of ASC. The “broad autism phenotype” (BAP), however, indicates impairments in one or two of these areas that do not reach the threshold for diagnosis of ASC (Folstein & Rutter, 1977). Many relatives of individuals with autism display elements from the BAP, thus showing elements of rigid behaviour or some social difficulties not severe enough to reach the threshold for diagnosis of an ASC. This has been shown by studies indicating parents and close relatives of those with autism are at elevated risk of not only autism itself but also other developmental disorders (Bailey, Palferman, Heavey, & Le Couteur, 1998).

In line with the theory of autism having a genetic aetiology, siblings of children with ASC are at much greater risk of being diagnosed with ASC compared to the general population (2-6%, compared to .01-.05%; Newschaffer et al., 2002). In addition, 12-20% of siblings have qualitatively similar autistic like traits that fall short of an ASC diagnosis (Newschaffer et al., 2002). Bailey et al. (1998) found that there was high variability in any affected siblings in terms of ASC, however a combination of impairments in two of three domains (i.e., the BAP) is significantly more common in relatives of autistic people, particularly so for male relatives. The majority of ASC siblings, however, are typically developing (TD) and not diagnosed with autism or related disorders.

2.2. Measuring Autistic Traits

Members of the general population also display various grades of autistic traits that may be measured using questionnaires such as the Autism Quotient (AQ; Baron-

Cohen, Wheelright, Skinner, Martin & Clubley, 2001). The AQ was designed to specifically quantify how autistically minded an individual is via self-report (although versions for children and adolescents exist which are designed to be completed by a primary care taker). Not surprisingly, individuals with an ASC diagnosis score significantly higher than those in the general (non-clinical) population. There are however, amongst the non-clinical population, a wide range of scores that form a normal distribution and adhere to a bell curve as hypothesised.

When using multi informants (parent, teachers and self-reports) to examine autistic traits, Ronald, Happe & Plomin (2008) found that parents rated children slightly higher on autistic traits than teachers and that children rated themselves higher than both parents and teachers. Thus it is possible that parents and teachers provide, if anything, a slight underestimation of the degree of autistic traits present in an individual child.

2.3. How ASC impairments manifest

When Kanner (1943) first described classic autism he said that these individuals had patterns of abnormal behaviour including giving an impression that they did not desire to be part of the normal social world- an autistic “aloneness” - although he was not attributing blame to the child or assuming this was out of choice. He stated that such children have an "... *inability to relate themselves* in the ordinary way to people and situations from the beginning of life. We must then assume that these children have come into the world with innate inability to form the usual biologically provided affective contact with people” (p. 250).

Kanner (1943) therefore emphasised that children with ASC have an inability to form relationships with other people, a lack of spontaneous imaginary and pretend

play, abnormal development of communication and language and obsessive insistence on particular interests and routines. It is important to note that ASC does not mean these children will simply be consistently detached (Yirmiya, Kasari, Sigman, & Mundy, 1989). Emotional expressions during interactions are often unusual or tricky to interpret. Differences in affective contact are not necessarily due to an inability to feel emotions, but more likely difficulty in their communication and understanding (Yirmiya et al., 1989).

Earlier but more recent theories of autism stated that people with the disorder lacked a theory of mind (ToM). The mind-blindness theory (Baron-Cohen, 1990), proposes that for autistic individuals there is an innate inability to understand or take another person's point of view or perspective. By not accurately or automatically “mind reading”, a person is at an obvious disadvantage. They are unable or much less able to predict someone else's behaviour or to react to a particular situation in a socially appropriate manner. Thus there may be a glaringly obvious social faux pas that the autistically minded individual is unaware of themselves, but which other typically developing people may find odd or disturbing. An inability to mind-read would also potentially manifest as an apparent aloofness and difficulty in communicating or establishing social relationship and close ties with other people. True empathy requires recognition and response to another person's state of mind, i.e., mind reading (Baron-cohen, 2008). Reports from those on the autistic spectrum indicate puzzlement over how to respond in particular situations (e.g. Grandin, 1996).

Autistic traits in any individual also seem to include preferences for predictable patterns over social interactions (for example, a preoccupation with computers or computer based past-times), feeling like social interactions do not come naturally or comfortably (e.g., disliking small talk) or having an interest in collecting

categories of things (Baron-Cohen, 2008). In children this may manifest as a preference for playing alone, fascinations with machines or intricate objects, collections of things belonging to categories, and being distressed or upset when routines are interrupted or altered, particularly without warning.

In combination with this, an important consideration when dealing with an individual with autism is that there seems to be deficits in entertaining or even enjoying the idea of non-truths that require a person to disengage with reality (Harris, 1989), something which will impede creativity during interactions and therefore make pretend play with other children difficult. The type of pretend play that a child with ASC does engage in is therefore usually more solitary and of a stereotyped and repetitive nature, and lacks the human drama one would expect to see in typically developing children (Harris, 1989).

One way of conceptualising autistic thought and behaviour patterns is in terms of preferences for systemising and relative weaknesses in empathising, as suggested by Baron-Cohen's Empathising-Systemising theory (Baron-Cohen, 2008). This two-factor theory proposes that the discrepancy between empathising and systemising determines the likelihood of an individual having an ASC. Within the theory, systemising is viewed as a drive within the individual to see things as and understand systems, to derive and interpret rules (e.g. collections of similarly classifiable objects, mechanical things, natural, social or motoric), preferences for noticing structure and regularity, and keeping variables constant so that it is easy to vary one part.

At the same time this theory accounts for there being a relative lack or delay in empathy in individuals with ASC. In its earliest and simplest forms, empathising involves the ability to determine whether another individual did something intentional (i.e. was an agent) (Premack, 1990), following another person's eye gaze (Baron-

Cohen, 1994), determining another's emotional expression (Ekman, 1992), engaging in joint attention, such as following pointing gestures or gaze (Mundy & Crowson, 1997; Scaife & Bruner, 1975; Tomasello, 1988), and displaying concern when someone is in distress and responding to emotional states (Yirmiya, Sigman, Kasari & Mundy, 1992). Empathising therefore is described as a tendency towards and an ability to recognise and react appropriately to emotions in other people, and a liking for being sociable and easily making social ties and friendships.

In a review of social relationships and autism, Travis & Sigman (1998) highlight a number of factors that children with ASC have difficulty with and which lead to an unintentional disregard for tact and social conventions. These include major conversational impairments, paralleled by deficits in joint attention, which is the sharing with another individual of both imperative and declarative information, both when initiated by them or another person. People with ASC tend to be more focussed on instrumental goals and much less so on sharing of affect or information. Their interactions, therefore, show an impairment in the ability to co-ordinate play or develop social relationships, and difficulties in reading mental states of other people, usually resulting in problems with pretend play for children. In adulthood this appears to manifest as (for example) an extreme lack of tact or disregard for social niceties, therefore appearing odd to other typically developing people. Interest in a single object, activity or certain facts characterises an individual with ASC's preference for systems and systemising (Baron-Cohen, 2002). Travis & Sigman (1998) also highlight evidence for deficits in processing emotions, for example abnormalities in emotional expressions (blends of different emotions, both positive and negative), and a certain ambiguity in vocalising emotions, which will often mean a failure to respond to typical emotions or emotional signals in another person. Being less responsive to

negative emotions than other children of a similar age is one of the biggest barriers these children face in building social relationships. There is also typically a large discrepancy between verbal, mental and chronological age, which also acts as an impediment in early social interactions.

3. Theoretical approaches for understanding the potential impact of ASC on families: Relational and family systems

Most research on families with a child who has ASC to date has focused more on parents of children with ASC than on the experiences of ASC siblings themselves (Glasberg, 2000). However all family members will be impacted upon due to the unique nature of ASC impairments (Hastings et al., 2005). Family systems and relationships approaches to child development emphasise the crucial role of relationships in shaping an individual (Reis, Collins & Berscheid, 2000). Each relationship forms part of a network of other relationships, with interactions embedded within, and affected by, past experiences as well as expectations regarding the future (Hinde, 1989). Relational interactions will both shape and depend on the characteristics of the individuals involved, including their feelings, wishes, and needs, and occur within the context of other social, environmental and physical systems (Reis et al., 2000).

A relationships approach to understanding child development therefore acknowledges that relationships are themselves continuously evolving systems, and that the family is a crucial part of such systems (Reis et al., 2000). This perspective is compatible with other theories such as Bronfenbrenner's ecological theory in providing a framework from which to consider how relationships influence an individual's development (Bronfenbrenner & Morris, 1998). These perspectives

essentially propose that various relationships and interactions in a child's life are the defining factors in their environment. Relationships thereby affect individual well-being and are the most frequent source of not only happiness but also distress (Reis et al., 2000). Although causal mechanisms are unclear, positive relationships are associated with subjective wellbeing, mental health and effective functioning of life activities, all of which begins in infancy and childhood.

Using such theoretical approaches as a backdrop, it is clear just how profoundly a child with a disability will affect the relationships and environment of every member of the family. The relationship between a typical child and their sibling who is not typically developing will influence the development of that TD child in the family, and make their experience of growing up unique compared to someone with a TD sibling. Dunn (1988) asserts that how a young sibling monitors, discusses and interprets their relationships between family members will influence their own relationships- reinforcing the view that relations within a family are never isolated but rather part of a wider system. This is important to consider as early relationships link with a number of emotional disorders later in life (Reis et al., 2000). Researchers (e.g. Dyson, Edgar and Crnic, 1989) assert that disabled siblings exert an influence on their typically developing brothers and sisters and provide a risk factor in terms of influencing the TD sibling's social and emotional development. Relationships also have subjective and objective aspects when viewed from the point of view of those involved and those observing the dynamic from the outside respectively (Hinde, 1989). The present research therefore investigated not only mother (outsider) perspectives but also that of children themselves (the insider perspectives). In order to understand how experiences of growing up may be different for children with non-TD siblings, it is important to first examine research regarding sibling relationship quality

for TD children.

4. Sibling relationships- the Sibling Relationship Quality (SRQ)

Approximately 80% of people in Europe and the United States grow up with at least one sibling (Dunn, 2002). Sibling relationships are one of the most enduring relationships in a person's life and are usually ambivalent, varying along a continuum of detachment and engagement, with those that are more engaged showing a combination of positive and negative behaviour (Harris, 1989). Thus sibling relationship quality (SRQ) can be considered in terms of positive (e.g. co-operation and support) and negative (e.g. conflict) dimensions (Dunn, 1993), and both have implications in terms of socio-cognitive development (Deater-Deckard, Dunn & Lussier, 2002).

Positive components of sibling relationship quality (SRQ) include sharing, playful or co-operative behaviours as well as support, helpfulness and nurturing. In practical terms, this could include siblings playing imaginary games together or showing concern or compassion when the other is ill or hurt. Positivity in SRQ has been linked with the development of more prosocial behaviour with peers (Downey & Condron, 2004) and higher levels of socio-emotional understanding (Howe, Aquan-Assess, Bukowski, Lehoux, & Rinaldi, 2001). The negative components of SRQ encompass jealousy and rivalry or conflictual interactions and tendencies. Behaviourally, negativity might therefore emerge as fighting or competing with each other, and rivalry for parental attention (Dunn, 1983). High levels of negativity in SRQ have been associated with potentially detrimental outcomes such as aggressive

behaviour and adjustment problems (Patterson, 1986). However negativity in SRQ can also benefit a child in terms of developing their social understanding; for example, arguing with siblings can foster the appreciation of another's point of view (Herrera & Dunn, 1997). Both rivalry and co-operation therefore help individuals to understand that other people have different points of view and different thoughts or feelings on a subject or towards any group decision, thus enhancing Theory of Mind development (Perner, Ruffman & Leekam, 1994).

Siblings have relationships that uniquely contribute to their development and interactions often characterised by asymmetries (e.g. Brody & Stoneman, 1986). The ages of the siblings in a dyad can influence each child in both emotional and a practical ways, for example, how much support or care is given and received (Brannen, Heptinstall & Bhopal, 2000). Usually the older sibling models and takes the role of teacher, with the younger sibling imitating (Knott, Lewis & Williams, 1995), roles that change with age as both children mature and become adults. Older siblings (OS) also tend to initiate more pro-social and antagonistic behaviour towards their younger brother or sister, regardless of age (Knott, Lewis & Williams, 1995).

4.1. Sibling relationships in families with a disabled child

Much research into sibling relationships has concentrated on typically developing children (for review see Brody, 1998). Given that SRQ has developmental consequences for an individual, it is important to look at whether there are implications for SRQ when one child in the dyad has a disability. A TD child growing up in a family where a sibling has a disability has unique experiences depending on the nature of the disability (Seltzer, Greenberg, Orsmond & Lounds, 2005). In such

families there is the potential for a lifelong unequal relationship, with one child or individual able to adapt and provide more support than the other, and correspondingly not receiving support from their disabled sibling. If one child has Down's syndrome (DS) they will behave more like the younger sibling regardless of their position in the dyad (Knott et al. 2005). Adopting this care-taking role is also common for YS of siblings with OS who have ASC (Ferraioli & Harris, 2010). Younger siblings taking on the traditional role of an older sibling towards their disabled brother or sister can be referred to as a reversal of age hierarchies (Dallas, Stevenson & McGurk, 1993).

It has been common in the literature regarding disabled siblings to compare pairs where one child has ASC with those who have a child with Down's Syndrome (DS), as both represent dyads with a disability but only one, the ASC dyads, include social and emotional deficits, and there are different temperamental aspects to DS compared to ASC (Fisman et al., 1996). Sibling relationships in families with DS tend to be reported in quite a positive light, perhaps because the temperament of these children is generally amiable and loving. Their relationships with other people are not greatly impeded by the disability itself. Thus the SRQ in some families with disabled children tends to be no different or even more warm and positive than in families with TD children.

4.2. Sibling relationships in families where one child has ASC

Recently there has been growing interest in siblings of children with ASC, and as such recognition of the importance of the sibling relationship in these families specifically (Rivers & Stoneman, 2008). A family with a child who has ASC is a case of developmental disability that may be particularly detrimental to the family

environment and harder for a typical child to cope with, as a defining feature of autism is abnormal social interaction and a lack of reciprocity in social exchanges (Rutter & Schopler, 1987) resulting in difficulties with affective contact and forming relationships with others. The markedly lower rate of response to distress shown by others (Travis & Sigman, 1998), greater level of unpredictability, social incompetence and inexplicability shown by ASC children (Morgan, 1988) will ultimately affect any dyadic interactions with a typical brother or sister. Therefore their siblings can be expected to show different patterns of advantages/disadvantages to siblings of children with other disabilities (Morgan, 1988).

In terms of consequences of having a child with ASC in a sibling dyad, the extant literature yields some mixed findings. A recent review by Ferraioli & Harris (2010) concluded that for dyads where one child has ASC, time spent together is not comparable in quality to dyads consisting of TD siblings. They also highlighted that an absence of imitation, functional and imaginative play will make it difficult to engage with the child with ASC, and that stereotypy or repetitive behaviours may be confusing for a sibling. Travis and Sigman (1998) observed that for children with ASC higher rates of interaction occur with siblings than with peers of the same age. Attempts to interact with peers are usually awkward and unsuccessful, but as they are familiar with siblings, children with ASC are more motivated to initiate social interactions with them than with strangers or unfamiliar children (Travis & Sigman, 1998). Siblings therefore provide an intermediate partner for a child with ASC to interact with. However, even with their siblings, children with ASC initiate, respond to, and partake in significantly less positive, negative, simple, and complex interactions than children with DS do with their siblings (Travis & Sigman, 1998).

Kaminsky & Dewey (2001) compared sibling relationships of children in

dyads that were TD to those where one child had DS and others where one child had ASC. The dyads where one child had ASC displayed less intimacy, nurturance and prosocial behaviour relative to the DS dyads. They concluded that siblings were important for social development skills and that positive relationships meant more social support. An additional finding for ACS dyads by Ross & Cuskelly (2006) was that aggressive behaviour was the most commonly reported interaction difficulty in families where one child has ASC, indicating more negativity in SRQ for these families.

Knott et al. (1995) compared sibling interactions amongst groups of 15 dyads with Down's syndrome and 15 dyads with ASC using home observations. ASC dyads showed a higher than expected rate of interaction but still significantly less time than DS dyads. Children with ASC did initiate interactions some of the time, but again, there was significantly less imitation and pro-social behaviour shown. In addition, less agonistic initiations were seen in these dyads. Some social skills were demonstrated with siblings but roles were asymmetrical, with non-disabled siblings making the most initiations. Overall there was less initiation of interactions and less imitation shown by ASC children. As with many studies of this type, a limitation was the use of volunteer families that may have had relatively good sibling relationships for this population.

Not all studies have indicated negative outcomes for ASC siblings in terms of SRQ. Pilowsky, Yirmiya, Doppelt, Gross-Tsur, & Shalev (2004) notably found no significant differences in TD sibling positive and negative emotional descriptions of ASC siblings compared to siblings of children with other disabilities. McHale, Sloan & Simeonsson (1986) reported that ratings of positivity and negativity in sibling relationships where one sibling has ASC were highly variable although not

significantly lower in positivity than for TD dyads. In fact, mothers reported that sibling relationships in TD pairs were more negative than those with a child with ASC or mental retardation. However age was also variable in this sample; being younger siblings aged between 6 and 15 years, and the sample size was fairly small ($n = 30$ each for the autistic siblings and typically developing groups). Implications for SRQ were also similar in small-scale ($n = 20$ per group) study by Roeyers & Mycke (1995), who identified a trend for ASC siblings and those with brothers or sisters with mental retardation to rate their sibling relationship more positively than those from TD sibling pairs. Potentially positive results for ASC siblings were also identified by Fisman et al. (2000), who found that the siblings of control (TD) children reported significantly more conflict and less warmth within the relationship than the siblings of children with PDD or DS.

A number of specific mechanisms also seem to be associated with SRQ in families with a child with ASC such as appraisal of stressors and understanding of autism by the TD child (Roeyers & Mycke, 1995). Rivers & Stoneman (2003) asserted that ASC siblings are generally satisfied by their sibling relationship but the quality of this is moderated by other characteristics within the family. Children seem to report lower levels of satisfaction as they grow older, possibly due to the growing developmental gap between themselves and their sibling (Rivers & Stoneman, 2003).

The roles of individual traits and interpretations of the family dynamics in determining SRQ were considered in a study by Rivers & Stoneman (2008). Research with typical sibling pairs has shown that when siblings are dissatisfied with the degree of differential parenting that occurs (i.e., the extent to which they perceive themselves and their siblings to be treated differently by their parents, and whether this is interpreted as being unfair or fair) SRQ can be compromised. Rivers & Stoneman

(2008) examined temperament, SRQ and differential parenting and found that the temperamental quality of persistence was related to better SRQ in both ASC and TD families, although more strongly for TD sibling pairs. Of course, in families with a disabled child, the degree of differential parenting that occurs will be greater as the two children will be very distinct in terms of the support they require physically and mentally. Rivers & Stoneman (2008) suggest that it is a child's satisfaction with this that matters, and it seems that the best approach to investigating the impact on TD siblings would involve both quantitative and qualitative methods, and ideally the viewpoints of parents and the children themselves.

An avenue pursued in understanding SRQ in the present thesis involved examining specific autism related traits of older siblings. As mentioned, recent findings have indicated that children with ASC differ in terms of the severity of each of the aspects that make up the autistic triad of impairments. Since two of these impairments relate to social functioning (social interaction and communication related impairments) and these are core aspects of meaningful human relationships, elevated scores for these particular impairments may be key to understanding the positive and negative elements of SRQ.

4.3. Assessing SRQ

It is usual to measure SRQ using observer ratings with questionnaires given to teachers, parents or primary caregivers to obtain average negativity and positivity ratings. This gives a general view that there is a wide range of how positive or negative SRQ can be between different sibling dyads. Relatively little qualitative research has asked children for their own perceptions of the SRQ, and their own experiences and interpretations of their experiences living with a sibling. Children are however recognised as having the ability to provide inside commentaries on their lives with a

brother or sister during interviews when asked to recount everyday life experiences (Edwards, Hadfield & Mauthner, 2005).

4.4. Qualitatively exploring SRQ

Researchers such as Sivberg (2002) assert that the ASC child affects the family as a whole, and as previously addressed, quantitative reports indicate less intimacy, pro-social behaviour and nurturing within the family and sibling dyad (e.g. Kaminsky & Dewey, 2001). Usually research is from an outsider perspective and using parental or observer ratings, which may be overly sensitive to negative situations (Bishop, Maybery, Wong, Maley, & Hallmayer, 2006). Any observer ratings are probably most useful for informing intervention strategies when they are combined with the real experiences described by children from these families. An individual's personal definition of a relationship may be the determining factor in what the consequences of that experience will be (Stocker & McHale, 1992) and thus a suggested direction for future research to take seriously is focusing on listening to the perspectives of family members and ASC siblings themselves (Meadan et al., 2010).

4.4.1. Qualitative reports of parents with children with ASC

Parents asked about their experiences with an autistic child in a qualitative study by Hutton & Caron (2005) emphasised the stress of raising such a child as well as some appreciation of small positive gains. The idea that ASC impacts on other family members in an emotional, logistic and practical way was supported. According to the parents, very few siblings were accepting of the ASC child's disability or range of disabilities. Parents also reported that their TD child experienced jealousy,

resentment, fear and sadness. It is likely that parents reports do not tell the whole story when it comes to a sibling's own experiences and interpretation. Social context and meaning are often ignored in sibling research (Steelman, Powell, Werum, & Carter, 2002), and little from the wealth of literature on sibling relationships is grounded in the children's own perspectives of the situation (Edwards, Hadfield & Mauther, 2005).

4.4.2. Children's reports of sibling relationships

Middle childhood is the age range that encompasses children from approximately 7 to 13 years. Part of the present research focused on the everyday life of children in middle childhood who have an older brother or sister with ASC. During middle childhood, children are considering their emotional relationships, their status and place in their world and social networks (Meadows, 1990), and children are actively constructing their understandings and interactions with other people (Mayall, 2002; Morrow, 1998), including their family members, with whom they spend most time. Since children can be considered as competent in interpreting the social world around them they can therefore be considered capable and knowledgeable informants on their sibling relationships (Edwards, et al., 2005), and interviewed about such topics. Interviewing children from different families was thought most useful in establishing commonalities as well as differences in their experiences.

Edwards et al. (2005) interviewed TD children on their sibling relationship and concluded that the relationships are varying and complex and that there was often a desire for separation and being apart at the same time as a desire to be close. Siblings were described as an integral part of the children's sense of self, whether it be by emphasising separation and autonomy or as a unit and the family tie. There were some

gender differences in this study. For boys, separation was indicated by a lack of shared activities, whilst for girls the same feeling of separation was usually related to feeling that they could not or did not get to talk to or confide in their sisters.

Conclusions from this study were that insider perspectives and how an individual interpreted their sibling relationship were the key aspect in understanding and accepting differences.

4.4.3. Children's reported experiences with ASC siblings

Siblings of children with ASC commonly have mixed emotions towards their affected sibling and have witnessed abusive or violent behaviour (e.g. Konidaris, 1997). A Swedish study asking children for their experiences with an ASC brother or sister found that these siblings had feelings of responsibility to their brother or sister, felt sorry and empathy for them, and were at times frightened by their behaviour which led to feelings of being intimidated and provoked much anxiety (Benderix & Sivberg, 2007). They also focused on how siblings get along with peers and showed that the experiences of having an ASC sibling have a negative impact on the TD child's friendships, affecting their relationships with other peers and their parents. Thus they were quite vulnerable to negative experiences and emotions. The Benderix & Sivberg study interviewed fourteen siblings from five families and used content analysis to analyse the results. This method of analysis establishes common themes amongst participants but does not necessarily examine the meaning of those experiences being reported.

4.4.4. Interpretive Phenomenological Analysis

In keeping with the child-focused approach (listening to the experiences of children themselves) examining the meaning of personal experiences may be better addressed by using Interpretive Phenomenological Analysis (IPA) as the main method of analysis. IPA is a suitable method of analysis when the researcher wishes to investigate issues that are personal and or involve complex processes (Kay & Kingston, 2002; Smith, 2004). IPA is concerned with exploring the participant's interpretation of their experiences, and in turn recognises that the researcher must also interpret this, rather than being able to gain direct access to someone's world (Willig, 2001). Since IPA focuses on determining the meaning of the text and the participant's account (Smith, 1996), participants can be asked for specific examples of occurrences from their daily lives. Qualitative findings, whilst valuable in themselves in terms of gaining insight into individual experiences, can also help establish factors that warrant further research in quantitative studies. As such, asking siblings whether they believe there are drawbacks or strengths in their relationship with their autistic sibling, and how they deal with these was an avenue pursued in the current thesis.

4.4. Sibling relationship quality of young adults

Most research focuses on SRQ in childhood rather than examining this unique relationship across the life-span. It has been suggested that the sibling relationship in adulthood will in part be determined by the quality of the relationship whilst growing up (Conger & Little, 2010). Similar to sibling relationships in childhood, adult sibling relationships are also characterised by warmth, conflict and rivalry (Stocker, Lanthier, & Furman, 1997). This is similar to the use of negativity and positivity to classify children's SRQ, and continues the idea of siblings as both sources of irritation and

support (Dunn, 1993). Cicirelli (1994) reported that the pattern of closeness in the sibling relationship changes throughout the life span, and that reports of satisfaction decrease as does contact in adolescence and young adulthood. In middle age and later both these tend to increase again. Nonetheless there are still consequences of positivity or negativity in these relationships, with better mental health being related to more positive (closer) sibling relationships in adulthood. The relationship between siblings who are adults may determine the level of social support they obtain from one another, particularly during times of stress and during the transition from the teenage years to adulthood (Conger & Little, 2010).

Adult sibling pairs are far more cognitively similar than they were as children and as such, may have more positive interactions overall, but one factor that differentiates the more positive from negatively valenced relationships may be individual traits or temperaments. Temperament is considered to be a relatively stable characteristic throughout the lifespan and one that correspondingly influences the SRQ in a relatively stable manner (Stocker & McHale, 1992). Personality and temperament related characteristics of each dyad member are likely to influence how supportive they are able to be and also how they perceive and interpret the other person's support or, conversely, lack thereof, for example perceiving the other as irritating. For example, adults reporting the highest level of warmth in their current sibling relationship also report higher levels of agreeableness and extroversion (Lanthier & Stocker, 1993). Higher similarity in personality traits has also been linked with higher perceived compatibility (Neale, 2000).

Little work has examined what individual traits of the two siblings might influence their relationship quality. As mentioned, researchers such as Baron-Cohen (2002) and Ronald et al. (2006) have suggested that autistic traits seem to lie on a

continuum throughout the population of typically developing adults, with those with ASC at the extreme end of the spectrum. Thus, a preference for forming emotional attachments and being sociable may be connected with lower levels of autistic traits, and help explain why some adult siblings have a more positive sibling relationship. Ronald, Happe & Plomin (2005) suggest that social and non-social autistic behaviours are not necessarily co-occurring. Despite having only modest correlations between them, both aspects appear to be highly heritable amongst the general population in addition to those with ASC showing phenotypic independence (Ronald et al., 2005). Indeed, considering these classes of behaviour separately has been suggested as a useful area for future research (Ronald et al., 2005). Thus these traits may help explain differences in young adult sibling relationships.

In the general population, autistic traits link with nonverbal sensitivity in terms of implicit and explicit knowledge of nonverbal cues (Ingersoll, 2009). We would expect therefore that any subtle social and communication impairments might influence everyday relationships. Murphy and colleagues (2000) found some support for the theory that the expression of the liability to autism is reflected in particular personality traits of close relations of individuals with ASC. This included a higher incidence of traits such as being withdrawn or difficult, which seem to reflect impairments in social functioning or communication. As such, subtle combinations of these might indicate the broad autism phenotype.

Young adults at college with a more strongly present autism phenotype (i.e. higher degree of autistic traits) have reported significantly higher levels of loneliness as well as shorter duration and lower frequencies of friendships (Jobe & White, 2007). In the general population autistic traits have also been linked with lower relationship satisfaction amongst husbands (Pollman, Finkenauer & Begeer, 2010), and with

depressive symptoms, a relationship partially mediated by social problem solving ability (Rosbrook & Whittingham, 2010). Examining whether family relationships such as that between siblings are of a lower quality when autistic traits are higher was a previously unexplored avenue addressed in this thesis.

4.5. Retrospective SRQ

A number of studies have used retrospective reports to examine childhood sibling relationships (e.g. Hardy, 2001; Stewart, Verbrugge & Beilfuss, 1998). Concurrent adult sibling relationships are likely to be influenced by past events and experiences had whilst growing up with that sibling. It is also probable that present relationships and circumstances influence an individual's recall, reconstructions and interpretations of childhood events (Stewart et al., 1998). It has been suggested that the accuracy of such reports does not necessarily determine how influential these memories and retrospective perceptions are (Felson & Zielinski, 1989) but also there is evidence for a reasonably good match between retrospective reports and actual events (Block, 1971). Although some studies have used retrospective reports of sibling relationships there appears to be a paucity of those taking into account views of both siblings and thus using dyadic reports. Including dyadic retrospective reports may be another useful way to further examine links between positivity and negativity in SRQ and autistic traits.

5. Psychological adjustment during childhood

Positivity and negativity in SRQ are potential predictors of a number of psychological outcomes such as an individual child's adjustment (Kim, McHale, Crouter, & Osgood, 2007; Pike, Coldwell, & Dunn, 2005; Stocker, Burwell, & Briggs,

2002) and of behavioural problems (Bank, Burraston, & Snyder, 2004, Slomkowski, Rende, Conger, Simons, & Conger, 2001). In simple terms, psychological adjustment is the process of adapting successfully and appropriately to one's environment, that is, to the stresses of daily living and the demands of interpersonal relationships. Maladjustment or adjustment problems therefore represent psychological distress- a failure to adapt appropriately- and can be divided into two broad categories, internalising problems and externalising problems (American Psychiatric Association, 1994). Internalising problems include symptoms of depression or anxiety, and manifest behaviourally in children in ways such as crying, extremely clingy or nervous behaviour. Externalising problems on the other hand include acting out, lashing out and violent behaviour (i.e. antisocial behaviour towards adults or other children). A cross-sectional perspective allows a researcher to determine risk of maladjustment (Fisman, Wolf, Ellison, Gillis, Freeman, & Szatmari, 1996) and both externalising and internalising are considered relatively stable characteristics that predict more serious problem behaviours in adolescence (Atzaba-Poria, Pike & Deater-Deckard, 2004).

5.1. Links between adjustment and SRQ

Studies of non-clinical samples of children have concluded that differences in individual adjustment relate to contemporary sibling relationships (e.g. Dunn, Slomkowski, Beardsall & Rende, 1994). Using a maternal interview of sibling relationships, Dunn, Slomkowski & Beardsall (1994) found that the quality of sibling relationships and behaviour towards each other is significantly related to a child's later sense of their own competence and attractiveness. Whilst highly aversive or conflictual social relationships are associated with adolescent externalising behaviours

(for review see Loeber & Stouthamer-Loeber, 1998), high levels of positivity in SRQ have been shown longitudinally to buffer against stressors in the family environment linked to depression or anxiety (Gass, Jenkins & Dunn, 2007).

Dunn et al. (1994) found that more negative and less positive interactions were related to higher levels of externalising behaviour both concurrently and longitudinally. For example, a lack of friendly and warm feelings towards a sibling showed links with later adjustment problems. Additionally, internalising and externalising features were positively correlated. Differences in affection and support by children as young as five years old to their younger siblings were sensitive predictor of their later internalising behaviours, a finding more stable for first as opposed to later born children. Thus younger siblings in particular may be particularly vulnerable to lack of affection from their older brothers or sisters, and a lack of friendly behaviour may even be more important (in a potentially detrimental sense) than high levels of conflict in a sibling relationship (Dunn et al., 1994).

5.2. Adjustment of siblings of children with disabilities

There have been mixed findings regarding whether having a disabled brother or sister impacts on a TD child's adjustment in families with disabled children. Some research has reported mainly negative effects, for example, perceptions by the TD child of inequalities and unfairness, stress, embarrassment and worries about the future (Bägenholm & Gillberg, 1991). The TD sibling can therefore be left with a precocious feeling of responsibility, and a care taking role may be required once the parents are no longer able to look after the disabled child in the family. Other studies

have been more positive regarding the effect on typically developing siblings. Powell & Ogle (1985) assert that children with disabled siblings have higher levels of empathy and understanding of difference in society relative to peers without disabled brothers or sisters. They also gain satisfaction at being able to live with a disabled individual, see pleasure in small accomplishments and develop warmth and compassion for people with disabilities (Powell & Ogle, 1985).

5.3. ASC sibling adjustment

Research on ASC siblings specifically has shown that these children are potentially at greater risk of adjustment difficulties than control groups without ASC siblings (Bägenholm & Gillberg, 1991; Fisman, Wolf, Ellison, & Freeman, 2000; Gold, 1993; Rodrigue, Geffken, & Morgan, 1993). In particular, a significantly higher risk of internalising problems amongst ASC siblings has been reported (Rao & Beidel, 2009; Ross & Cuskelly, 2006). Results in this area are not consistent however, and other studies have indicated that ASC siblings are relatively well adjusted in comparison to those with TD siblings or siblings with DS (e.g., Kaminsky & Dewey, 2002; Mates, 1990). The following section describes a number of studies addressing ASC sibling adjustment, thus illustrating the mixed findings from the extant literature.

Rodrigue, Geffken & Morgan (1993) compared siblings of severely autistic children to siblings of children with DS and TD sibling pairs on behavioural, social and emotional adjustment difficulties. No differences were found in measures of mother reported social competence or perceived self-competence. There were, however, significantly higher scores for the ASC sibling group on both internalising and externalising behaviour problems, although these were not considered to be in the clinically significant range. Older siblings in all three groups were more likely to have

higher internalising difficulty scores, and older siblings of children with ASC were likely to have more externalising problems. This is in contrast to some other research indicating younger siblings are more vulnerable to adjustment problems in ASC families. For example, Hastings (2003b) used results from mother-rated strengths and difficulties questionnaire (SDQ) scores for 22 siblings of children with autism and compared these to a normative sample. Rates of adjustment difficulties for ASC siblings were significantly higher on behavioural problems and lower prosocial behaviour. Being male and a younger as opposed to older sibling to the ASC child were also additional risk factors for displaying fewer prosocial behaviours (Hastings, 2003b).

In a study comparing 98 siblings of children with ASC to 48 TD sibling pairs Lefkowitz, Crawford & Dewey (2007) obtained parent and child ratings regarding behavioural, social and emotional adjustment. They found ASC siblings to be at higher risk of behavioural and emotional problems and difficulties in the peer arena compared to the children from TD pairs. Interestingly, agreement between children and parent ratings was significantly correlated for the children from ASC families but not those in TD families. Lefkowitz et al (2007) thus suggest that parents in these ASC families may be particularly accurate in their perceptions of the social and emotional functioning of their TD child. This also lends support to the use of parent ratings of adjustment in identifying potential negative outcomes for ASC siblings. Emotional and social competence problems have not been consistently reported, although there has been more consistent support for behavioural problems amongst ASC siblings (Lefkowitz et al., 2007). Lefkowitz et al. (2007) found no support in this study for younger or older ASC siblings being more at risk of over all adjustment problems.

Fisman et al. (1996) investigated siblings of children with PDD, Down's syndrome and TD children using multi respondents (teachers and parents as well as some sibling reports). All participating children were healthy siblings with no significant diagnosed developmental disorders. The initial cross sectional data indicated there were significantly more difficulties amongst the PDD siblings. Parents reported significantly more externalising as well as internalising problems in PDD siblings than controls, and teachers reported only significantly more internalising (but not externalising) problems in PDD than DS or control siblings. Parent distress was found to mediate the relationship between sibling type and internalising or externalising. The authors raise the issue of distal compared to proximal risk factors. A follow-up longitudinal study three years later similarly found significantly more adjustment problems in siblings of PDD children compared to the DS or control groups (Fisman, Wolf, Ellison, & Freeman, 2000). This was particularly so for internalising problems as reported by teachers.

In contrast to the above studies showing ASC siblings are potentially at risk of adjustment problems, some research has indicated the opposite pattern, that ASC siblings are relatively well adjusted. Kaminsky & Dewey (2002) compared 30 TD siblings of children with ASC to 30 TD siblings of children with DS and 30 TD sibling pairs. The majority of siblings were older than the child with the disability (80%) and aged between 11 and 12 years. No significant differences between groups were found on any of the adjustment subscales or loneliness ratings, indicating ASC siblings were relatively well adjusted. Better adjustment was seen for children from families with more siblings, however the relatively small sample size meant that comparisons between OS and YS ASC sibling adjustment was not possible. The majority of families in this study also attended support groups (77%), a factor which

could potentially buffer any detrimental impact on the TD child of having a sibling with ASC.

The finding that ASC siblings whose parents attended support groups had lower levels of adjustment problems than those whose parents did not (Kaminsky & Dewey, 2002) intuitively makes sense in that research has also shown parents who are well supported themselves (in terms of social support) are themselves better adjusted and report lower levels of stress (Gray & Holden, 1992). Having a child with ASC puts parents at greater levels of stress on average than other developmental disorders (Gray & Holden, 1992), and it is a feasible assumption that there will be some spill over from this to typically developing siblings of children with ASC. Hastings (2003a) focused on families with an ASC child who was engaged in Applied Behavioural Analysis as a form of remedial therapy. Mothers did not report significantly higher rates of adjustment problems in comparison to normative data, although there was a lower risk of adjustment problems for these siblings when the child with autism exhibited lower symptom severity in combination with there being higher levels of formal social support.

Pilowsky et al. (2004) also examined adjustment of TD siblings but compared ASC siblings to siblings of children with mental retardation and another group of siblings of children with developmental language disorder. They concluded that most siblings were in fact well functioning and neither sibling gender nor birth order was associated with emotional or social adjustment. This is somewhat in contrast with other studies, but may stem from the limited sample size (Pilowsky et al., 2004). The age range of participants in this study covered both middle childhood and teenage years (6 to 16 years) and two thirds were the older child in the dyad. Lack of a TD comparison group should also be noted from this study, in addition to the fact that not

all siblings were from separate families (30 siblings in the ASC group were from 22 families).

Benson & Karlof (2008) also found no evidence for increased risk amongst ASC siblings using parental reports of adjustment. Benson & Karlof attempted to control for the genetic vulnerability to ASC by ruling out children who had any pre-existing diagnosis of clinical psychopathology. They concluded that although child impairments were related to poorer adjustment, siblings without diagnosis are potentially not at risk of adjustment problems. There also appeared to be a link between parental educational involvement and positive sibling adjustment, indicating how the family environment may lead to less stress and conflict within the family. The authors also found that stressful life events and family climate significantly predicted pro-social behaviour, and that therefore perhaps in families with a disabled child stress and conflict are particularly problematic.

5.3.1. Explaining mixed findings

The variability in past research strongly highlights the need to understand risk and protective factors in a child's environment, and indicates that focussing on groups within a specific age range may be warranted (Orsmond & Seltzer, 2009). A number of researchers emphasise the importance of looking at measures that can assess sub threshold autistic characteristics in ASC siblings and thus take into account the genetic vulnerability, i.e., the BAP, as this also may account for mixed findings (Benson & Karlof, 2008; Constantino et al., 2006; Orsmond & Seltzer, 2009). The presence of the BAP could represent a genetic susceptibility to psychological difficulties, meaning some ASC siblings are more vulnerable to adjustment problems than others (Ferraioli & Harris, 2010). Other potential intervening factors include the

wide age range of the siblings sampled and inclusion of more than one family member (i.e., more than one sibling from the family) in the same study (Cuskelly, 1999). Being in a same sex dyad has also been implicated in adjustment problems in families where one child has a developmental disorder (Ferrari, 1984). Orsmond & Seltzer (2009) examined adjustment in adolescent ASC siblings using a diathesis-stress model, with anxiety and depression as the main outcome symptoms. Their hypothesis was partially supported; ASC siblings with autistic characteristics themselves (albeit non-clinical) were more susceptible to internalising adjustment difficulties only when also exposed to a higher number of stressful life events. Children's own reports also indicate that TD siblings are usually important sources of support during stressful life events such as parental divorce (Abbey & Dallos, 2004).

Petalas, Hastings, Nash, Lloyd, & Dowey (2009) suggest that siblings born after a brother or sister with autism have different experiences to those born before, and therefore birth order has a significant effect on their emotional and behavioural adjustment. Birth order has been taken account of in some studies of ASC siblings but often the majority (>60%) of siblings in a sample are the older in the dyad (e.g. Lefkowitz et al., 2007). A review of recent studies indicated that birth order was a significant predictor of TD sibling adjustment in some but not all studies (Meadan et al., 2010). Where possible, larger scale studies to compare any birth order effects are warranted (Meadan et al., 2010). However in the absence of the necessary resources, it would thus seem prudent for studies to focus only on either younger or older siblings.

In a two-year longitudinal study Hastings (2007) found ASC siblings to be relatively well adjusted according to mother reports. Sibling adjustment over time was predicted by the initial behavioural problems of the child with the developmental

disability, indicating that severity of autistic symptoms or traits could be another important factor to consider in TD sibling adjustment. Macks & Reeve (2007) also found that only when certain demographic risk factors are present is a sibling of a child with ASC more at risk of adjustment problems. Risk factors identified included gender, being older than the child with autism, low SES of the family and only having one other sibling (family size). Parents of ASC children did however view their TD child's social and emotional adjustment somewhat more negatively than comparison families with only TD children.

5.3.2. Is SRQ associated with the adjustment of ASC siblings?

Few studies have examined SRQ as a potential correlate, moderating or mediating factor of YS adjustment in families with one child diagnosed with ASC and another typically developing. Given that in typical dyads SRQ is related to adjustment (Pike et al., 2005), investigating these links in ASC dyads would appear to be highly appropriate. It may be that SRQ acts as a moderating variable- buffering against adjustment problems even in families with ASC. For example, a sibling relationship where one child has ASC that is relatively high in positivity, may in fact mean the TD sibling is less predisposed to adjustment problems. The reverse may be the case for high levels of negativity in the relationship. It may also be that SRQ is a mediating variable, and that (for example) high levels of negativity in the relationship are actually responsible for the links between having an ASC child in the dyad and TD sibling adjustment difficulties.

One study by Fisman et al. (1998) reported that TD child adjustment is more closely related to the perception of differential treatment than to SRQ in families with a disabled child. Similarly in a follow-up study there did not appear to be evidence for

sibling relationship factors as predicting adjustment in a longitudinal sample (Fisman et al., 2000). Fisman et al. (2000) found that SRQ was not a mediating factor in determining parent or teacher reported externalising or internalising problems of siblings. Although parental distress was linked with characteristics of the disabled child and difficulties in interactions, the possibility of SRQ as a moderating factor in adjustment was not examined.

Currently there is no consensus on whether ASC siblings are or are not at risk of adjustment difficulties. How the sibling relationship itself contributes to sibling wellbeing has been cited recently as an area where more research is needed (Orsmond & Seltzer, 2009). Meadan et al. (2010) suggest that there might be a specific age range where more support is required for ASC siblings, i.e., specific time points when the sibling is more at risk. Although some studies have considered autism severity in influencing TD sibling adjustment, none have examined links between specific ASC traits and either SRQ or adjustment. Given potential intervention strategies need to be informed by gaining insight into factors influencing social, behavioural and emotional problems and difficulties (Benson & Karlof, 2008) and the call from Hodapp et al. (2005) to examine potential mediating and moderating variables, a viable research avenue was to assess whether autistic traits in the dyad and SRQ relate to TD sibling adjustment.

6. Aims and hypotheses

The research involved in this thesis aimed to examine the effects of having a child with ASC in the family on a younger typically developing (TD) sibling (in families with more than two children this was the brother or sister closest in age), and to extend these findings to an analogue sample of young adults in the general population. This standpoint was in line with a relationships approach to understanding child development, acknowledging that relationships are continuously evolving systems that will both shape and depend on the characteristics of the individuals involved, including their feelings, wishes, and needs (Reis et al., 2000).

Previous research has considered SRQ and adjustment in families with ASC but, like most research on family relationships and disability, has produced conflicting findings- sometimes positive outcomes and at other times negative outcomes are identified for TD siblings. A review of adjustment of ASC siblings by Meadan, Stoner & Angell (2010) attributed this to the wide range of different study aims, measures and methods. Similarly, Hodapp et al. (2005) advocated closer examination of potential mediating and moderating variables in sibling research.

As mentioned, recent findings have indicated that children with ASC differ in terms of the severity of each of the aspects that make up the autistic triad of impairments. Since two of these impairments relate to social functioning (social interaction and communication related impairments) and these are core aspects of meaningful human relationships, elevated scores for these particular impairments may be key to SRQ. The aims of the present thesis were to examine SRQ and adjustment in families where an older child had a diagnosis of ASC, and to investigate which particular aspect of autistic traits, deficits in social skills, deficits in imagination, deficits in mind reading ability, and attention to detail, of the ASC children were

related to positivity and negativity in SRQ. More specifically, the potential role of these autistic traits as mediators and moderators of TD sibling outcomes was examined.

The first study was an open-ended qualitative approach, which broadly looked at children's experiences with their ASC siblings. This approach did not have a specific hypothesis behind it, but rather aimed to listen to the voices of the children themselves and establish any common or diverging themes in the experience of growing up with a brother or sister with ASC.

In the second study it was hypothesised that overall there would be less positivity but not necessarily a difference in negativity in SRQ in ASC families than in families with two TD children. More specifically, we thought that more pronounced deficits in imagination, mind reading and social skills would be associated with lower positivity in SRQ, and that deficits in social skills would also be associated with more negativity in SRQ. Impairment in these areas was hypothesised to mediate differences in SRQ found between family types. For example, it was thought conceivable that increased levels of negativity in SRQ is only present if social skills are more impaired in the OS, rather than simply being due to the presence of an older sibling with ASC. We further hypothesised that the non communication-related aspect of autistic traits, attention to detail, would not be associated with SRQ.

In the third study we had two main aims. Firstly we aimed to investigate links between traits relating to autism and retrospective dyadic accounts of SRQ by young adults. Although potentially subject to memory biases, the use of dyadic retrospective reports was seen as an alternative method that could lend support to the cross-sectional data from study two. In line with study two it was expected that higher scores on imagination impairments would relate to higher positivity in retrospective

accounts of SRQ, and higher impairments in social skills and mind reading ability to relate to higher retrospective accounts of negativity in SRQ. We also sought to explore how each autistic trait may be uniquely related to dyadic reports of current SRQ amongst these young adults. We examined whether higher self-reported autistic traits in terms of attention to detail, imagination, social skills and mind reading could predict lower dyadic warmth and higher conflict and rivalry in adult SRQ.

In the fourth study we focused on the mechanisms by which ASC siblings may be at risk of adjustment difficulties by looking at whether positivity and negativity in SRQ moderated or mediated YS adjustment. We also explored whether particular autistic traits of the OS with ASC (impaired imagination, impaired mind reading, impaired social skills and attention to detail) could be linked to YS adjustment. We hypothesised that direct links would be mediated and moderated by SRQ and specific OS autistic traits. For example, it is conceivable that YS adjustment is negatively affected by factors like high levels of conflict with siblings rather than the presence of a sibling with ASC. Likewise, it is possible that growing up with an ASC sibling only affects adjustment if negativity in SRQ is also particularly high. Therefore, in order to obtain a detailed picture of correlates of YS adjustment in ASC families, mediation and moderation processes were examined.

7. Outline of studies

In sum, this thesis consists of four articles examining autistic traits, sibling relationship quality and TD sibling adjustment. The first was a qualitative look at the experiences of six typically developing (TD) children growing up with an older brother or sister with ASC. Little research has asked children about their own interpretations of the experience of growing up with an older ASC sibling, and even less has looked at the UK population. As mentioned earlier, relationships approaches to development emphasise that relationships between family members exist as part of a wider system and have direct and indirect influences on each person. Therefore asking children to reflect on their experiences within a sibling relationship was deemed an appropriate starting place in gaining a more in depth understanding of what it is like to grow up with an older brother or sister with ASC. Semi-structured interviews were conducted that lasted up to 45 minutes with questions designed to be open-ended and elicit responses from children regarding positive and negative experiences during interactions with their brother or sister who has ASC. IPA was deemed appropriate because it focuses on individual experiences and therefore allowed an in-depth analysis of participants' cognitions, feelings and reflections on interactions with their ASC sibling, yielding insight into what it is like for each child living with a brother or sister who has ASC. The accounts were often quite frank and described in some detail what mothers might be observing when reporting on the positivity and negativity in the relationship quality in quantitative terms. The main themes that arose from the interviews were; empathy and emotional contagion, the emotional reactivity of the ASC sibling, a desire for harmony and togetherness, adjustment and resilience, and finally ambivalence, harbouring both positive and negative opinions about their sibling. These were discussed in terms of how TD

children experience and adapt to the child with ASC in the family, and what they mean for offering support to the siblings of children with ASC.

These qualitative accounts led on to the second study, looking at overall group differences between families with and without a child with ASC in terms of mother-reported sibling relationship quality (SRQ), and also the relationship between specific autistic traits of older siblings (OS) in the dyad and SRQ. Family systems theory would assert that SRQ is important to research since whether sibling interactions are highly aversive or positive could be a key part in how siblings influence each other's development. Considering that autistic traits exist in the general population on a continuum, with those receiving a diagnosis of ASC at the extreme higher end, we then sought to elucidate this sibling relationship further by looking at which areas of autistic impairments mediated negativity and positivity in SRQ. For example, it was thought that the imagination ability of the OS may be a significant contributing factor to positivity in SRQ, as pretend play is a large contributor to children's and sibling's daily interactions. Significantly more negativity and significantly less positivity in SRQ was reported in families with an ASC child in the dyad compared to two TD children. The association between ASC in the family and negativity in SRQ was mediated by the degree of impairments in social skills and mind reading ability of the OS, and the relationship between ASC in the family and positivity in SRQ was mediated by degree of impairments in imagination ability of the OS. These findings indicate that different autistic traits may be responsible for positive compared to negative elements of sibling interactions, as opposed to group differences being attributable just to the family environment.

Article three extended the idea of autistic traits being linked to SRQ, but amongst the general population. This not only addressed the idea of what influences

sibling relationships in young adulthood, but also whether findings from the previous study could be generalised to a wider age group. Sibling pairs self-reported on their “autistic personality traits” and their relationship with the sibling nearest to them in age. Thus dyadic ratings for current adult SRQ as well as dyadic retrospective ratings were obtained. Once again, the autistic traits considered were attention to detail, impairments in social skills, impairments in mind reading and impairments in imagination. Results supported the previous study to some extent. Significant links were found between imagination impairments and positivity in retrospective SRQ, but impaired social skills and mind reading were not linked with negativity in retrospective accounts of SRQ. Similarity in attention to detail scores was significantly associated with lower levels of rivalry in current adult SRQ. Again, these results support the idea that autistic traits relate to personal relationships.

The fourth and final article also looked at SRQ but this time focused on its relation to adjustment for TD siblings in ASC families. Data was obtained from the same sample of families as that used in paper two. Since the focus was now on purely outcomes for the YS (rather than a dyadic SRQ rating as the outcome variable), it was felt that writing results up as a separate paper was warranted. Looking at the psychological adjustment of YS was chosen as the dependent outcome as this concept links with a child’s emotional development and thought to be largely influenced by their familial relationships, as outlined by family systems and relationships approaches to child development. This study also sought to identify whether it was the family environment that included an ASC sibling which was related to YS adjustment, or whether there were specific elements relating to the autism in terms of specific OS autistic trait severity that were mediating or moderating the potential links. Overall group differences between family types were significant for two

measures of YS adjustment. Siblings of ASC children had significantly higher levels of emotional symptoms and peer problems than siblings of TD children. It was thought that variability in adjustment could potentially be explained by the quality of the relationship, that is, that SRQ could either be responsible for (i.e. mediate) or would affect (i.e. moderate) the outcome of adjustment for YS in ASC families. It was thought that more negativity and less positivity would lead to higher rates of adjustment problems, however this was not supported. In addition, specific OS autistic traits were again tested as mediators and moderators to see which may be responsible for poorer younger sibling (YS) adjustment outcomes. Attention to detail both mediated and moderated the relationship between family type and YS emotional symptoms, indicating that when OS score particularly strongly in this domain, TD younger siblings may be particularly vulnerable to internalizing adjustment difficulties.

Overall, these studies identified links between autistic traits, typical YS adjustment and the quality of sibling relationships. Mean differences were found between families with OS with ASC and those with two TD children for negativity and positivity in SRQ and two adjustment subscales (peer problems and emotional symptoms), findings in line with some, but not all, previous research. Considering separately the influence of each trait in terms of being potential moderators, mediators and correlates of SRQ and adjustment difficulties, highlights potential mechanisms by which YS in ASC families are at greater risk of negative outcomes. Results from these studies could therefore be used to elucidate previously mixed findings and be applied to both families with children with ASC as well as the general population.

Article 1:

“I wish he would play with me more”: Children's reports on the experience of growing up with a sibling who has an autism spectrum condition

Zoë Wheeler & Richard de Visser

(submitted to Qualitative Health Research)

Abstract

This study investigated the qualitative experiences of children who have siblings with autism spectrum conditions (ASC). Six children aged 7 to 13 years were interviewed regarding their sibling relationship with a particular focus on positive and negative interactions and emotions in experiences with their sibling. Interviews were transcribed and analysed using interpretive phenomenological analysis. Children's accounts clustered around five themes including empathy and emotional contagion, the emotional reactivity of the sibling, a desire for harmony and togetherness, adjustment and resilience, and ambivalence- voicing both positive and negative feelings towards their sibling. Implications for interventions and support for siblings of children with ASC are discussed.

Theoretical background

Living with a child who has an Autism Spectrum Condition (ASC) is a challenging and stressful experience on a day-to-day basis and affects the family as a whole (DeMyer, 1979; Sivberg, 2002). Unfortunately such families often report inadequate support services (Fong, Wilgosh & Sobsey, 1993). There is a need to listen to the experiences of families themselves, so as to gather information to guide further service provision. The systemic approach recognises that families exist as a system and therefore siblings as well as parents should ideally be involved in treatment or support services (Kazak, 1997). Exploring personal experiences with a qualitative approach is considered particularly valuable in connection with addressing these treatment and remedial options within the family context, yet the perspectives of children themselves are often overlooked (Fiese & Bickham, 1998). As relatively little research has focussed specifically on experiences voiced by children living with ASC siblings (Benderix & Sivberg, 2007), the aim of the present study was to focus on such everyday experiences.

ASCs are a class of developmental disorders characterised by a triad of impairments in social interactions, communication and imagination (DSM-IV, 1994) and are thought to affect 0.01-0.05% of children (Fombonne, 2003). In behavioural terms, a child with ASC will often have narrow interests, repetitive behaviour patterns and an intense need for routines with correspondingly high anxiety when these are broken. This lack of flexibility is accompanied to varying degrees by difficulties with empathising, which includes judging intentions (Premack, 1990), and recognising and reacting to others' emotional states (Yirmiya, Sigman, Kasari & Mundy, 1992). A child with ASC has trouble entertaining the possibility of "non-truths", meaning play and imagination is restricted or impaired relative to the play of typically developing

(TD) children (Harris, 1989).

Not surprisingly, one main outcome from these impairments is that children with ASC have trouble forming social ties. Siblings of children with ASC therefore live with a child who is quite different in their requirements and behaviour patterns: as a result, they have unique experiences due to the nature of their sibling's disability (Seltzer, Greenberg, Orsmond & Lounds, 2005). Sibling relationships naturally have consequence in terms of emotional and social development (Deater-Deckard, Dunn & Lussier, 2002). Social relationships high in conflict or aversive experiences and negativity in sibling relationships have been linked to adjustment problems, externalising and aggressive behaviours (Loeber & Stouthamer-Loeber, 1998; Patterson, 1986; Richman, Stevenson & Graham, 1982). There may be a number of detrimental effects for siblings of children with special needs due to perceived inequalities in parental treatment and raised stress levels within the family (Bågenholm & Gillberg, 1991; Knott, Lewis & Williams, 1995; Opperman & Alant, 2003; Orsmond & Seltzer, 2009).

If one child within a sibling pair is disabled there is likely to be an unequal relationship, with the TD sibling able to adapt and provide more support than they receive. For example, younger TD siblings often take on roles traditionally associated with being an older sibling regarding their disabled brother or sister (e.g., Dallas, Stevenson & McGurk, 1993). Some studies have reported that there may be a number of positive outcomes for these TD siblings such as increased empathy and compassion relative to peers without disabled brothers or sisters (Powell & Ogle, 1985), and more nurturing behaviour (Lobato, Miller, Barbour, Hall, & Pezzullo, 1991). The behavioural and emotional disturbances involved with ASC however, may have more detrimental effects on TD siblings than other disabilities (Rodrigue, Geffkin, &

Morgan, 1993). For example, Kaminsky and Dewey (2001) found lower levels of prosocial behaviour, intimacy and nurturance among sibling pairs in families with an autistic child, compared to families with a child who had Down's syndrome.

The few studies of children's qualitative accounts of their sibling relationship also indicate there may be potentially detrimental outcomes. Siblings of children with ASCs often report witnessing abusive and violent behaviour, and commonly seem to have mixed emotions towards their ASC sibling (Konidaris, 1997). Mascha & Boucher, (2006) similarly concluded that behavioural problems of the ASC sibling such as uncontrolled anger and aggression contribute to a number of negative emotions in TD siblings and are seen as serious problems that affect the TD sibling's lives. Benderix & Sivberg (2007) also reported that siblings of children with ASC and mental retardation were vulnerable to a number of negative experiences and feelings such as being threatened or frightened, despite understanding the situation and feeling empathic and responsible. Living with the ASC sibling also seemed to negatively influence the TD child's relations with other friends and peers.

Understanding the thoughts and feelings of children can help in designing more effective intervention programmes (Walker, Caine-Bish & Wait, 2009) and how an individual TD child experiences and interprets their daily interactions with an ASC sibling may determine whether they will be affected negatively and whether they require extra support from outside the family. Thus there is a need to listen to children themselves. Steelman et al. (2002) argue that social context and meaning are often ignored in sibling research: although there exists a wealth of literature on sibling relationships, little is grounded in the children's own perspectives of the situation (Edwards, Hadfield & Mauther, 2005). Since siblings are considered to be both sources of support and of irritation, there is a need to ask children for their own

experiences so as to look at both the positive and negative aspects (Borland, Laybourn, Hill & Brown, 1998). The present research focused on the everyday life of children in middle childhood who have an older brother or sister with ASC. During middle childhood - between the ages of 7 and 13 years - children are considering their emotional relationships, status and place in their world and social networks (Meadows, 1990). It is therefore reasonable to assume that children are actively constructing their understandings and interactions with other people (Mayall, 2002; Morrow, 1998), including their family members. They can be considered as competent in interpreting the social world around them, and therefore as capable and knowledgeable informants on their sibling relationships (Edwards, et al., 2005).

Interpretive Phenomenological Analysis (IPA) is a suitable method of analysis when issues of interest are personal or involve complex processes (Kay & Kingston, 2002; Smith, 2004). In searching relevant literature, we found only a few studies that had used IPA to investigate the experiences of siblings, and none using this method of analysis for siblings of children with ASC. Although content analysis with semi-structured interviews would determine categories and frequencies of responses, and grounded theory is used to develop a theory stemming from direct observations at a societal level, IPA is idiographic and more concerned with exploring the participant's interpretation of their experiences. However, IPA also recognises that the researcher must interpret participants' explanations of their experiences, rather than being able to gain direct access to someone's world (Willig, 2001). IPA therefore focuses on determining the meaning of the text and exploring the participant's subjective account (Smith, 1996). It is a method of analysis that allows conclusions to be drawn regarding how individuals manage the task of actively making sense of their experiences and the things that happen to them, and assumes this is a task people are

constantly engaging in. In the present study participants were asked to recount experiences from their daily lives and IPA was deemed appropriate because it allowed an in-depth analysis of their cognitions, feelings and reflections regarding interactions with their sibling.

In line with the aims of Edwards et al. (2005), the present study aimed to listen to the experiences of children themselves (a child-focused approach), and thus determine what is important to them in living with a child with ASC. As far as we know the study is the first of its kind interviewing siblings of children with ASC that focuses on their individual experiences and uses IPA as the method of analysis. Each child interviewed for the present study was from a different family, contrasting with qualitative studies using siblings from the same families (e.g. Benderix & Sivberg, 2007; Mascha & Boucher, 2006).

Method

Sampling and Criteria

A dominant strategy in qualitative research is to engage in purposeful sampling (Patton, 1990), which aims to obtain potentially “information rich” cases that can be studied in a detailed way. IPA requires a homogeneous sample wherein all participants share a similar experience. The criteria for participation in this study were as follows:

- (a) The participants must be younger siblings of a child with a clinical diagnosis of an autism spectrum condition and living in the same household.
- (b) The participants live with two parents.
- (c) The younger participating child did not have a diagnosis or suspected diagnosis of autism or another developmental disability.

Parental report was used to ascertain whether there was a single case of ASC in the family. Families themselves were recruited from ASC support groups or special needs classes at primary schools.

Informed consent

The study was approved by the appropriate University Ethics committee. Parents were asked to contact the researcher and consent to the interviews on behalf of their typically developing child. Consent was also obtained from the child by the researcher at the start of each home visit before the interview began. Each child was asked whether they would like their mother present during the interview, but all declined.

Demographics

The six participating children were aged between 7 and 13 years and all came from different families. Two had more than one brother or sister. Two children had a brother or sister with a diagnosis of learning difficulties in addition to autism, two had a brother or sister with Asperger's syndrome, and two had brothers with high functioning autism. Four of the children were female and two male, and of these, two girls and one boy had older sisters with ASC and two girls and one boy had older brothers with ASC.

Data Collection Techniques

Phenomenological investigation usually involves long interviews with participants, as this is how data are collected on specific topics and questions. Interviews were conducted to investigate and explore the experiences of children growing up with an ASC sibling in order to understand what kinds of interactions occur. Siblings were asked to recount both negative and positive experiences and how they dealt with them, thus yielding insight into what it is like for each child living

with a brother or sister who has ASC. The interview was formatted in a semi-structured way, such that there were standard questions that could be asked of each participating child but the order could be changed, and subsequent questions could depend upon, and be tailored around, the answer to the previous question. There were a number of visual activities or diagrams that were used to encourage discussion and talk towards the end of each interview (e.g. boxes to fill in entitled “Things I like” and “Things my brother/sister likes”). Each child could pace the activities and talking how they preferred; however not all children chose to do these and the analysis focussed on the spoken word.

Interview Schedule

To build rapport with the interviewees, the sessions began with general talk about how old they and their brother/sister were, pets in the family, or whether they liked school. This lasted as long as was deemed appropriate before asking children to describe their ASC sibling (although the term ASC was not used). Children were aware that the interviewer had come to talk to them about the specific sibling.

In keeping with IPA approach, it was deemed appropriate to identify some general themes before the interview, and to develop some guiding thematic questions. However, the interviews were semi-structured and were conducted flexibly to enable the interviewer to ask about children’s personal experiences and how they make sense of themselves and others, specifically their sibling with ASC (thoughts, feelings, perceptions implied when describing interactions and experiences). Children were asked about their “everyday” experiences in living with their autistic sibling and what this meant for their relationship, in order to gain an in depth understanding of these children's experiences of living with a brother or sister who has an ASC. The initial questions revolved around three themes in the interview and included asking children

to:

- (1) give narratives of their experiences of interacting and playing with their ASC sibling, including how they react emotionally;
- (2) describe their understanding of autism and how this affects their brother/sister and the family; and
- (3) talk about their sibling relationship quality in terms of the aspects that were negative (things they do not like or things that make them unhappy/annoyed) and positive (things they do like, things that have occurred that have made them happy or been fun).

The questions targeted memories of events and situations that had elicited particular emotions, as well as pleasurable and not so pleasurable interactions. Participating children were given a chance to add anything or ask any questions they wanted to throughout the interview. Prompts or verbal reminders, as recommended by Deatrick and Ledlie (2000), were used to encourage children to expand on their answers to interview questions. Participants were also given the option towards the end of the interview to use drawings alongside verbal responses, particularly when at a loss for words or feeling shy about expanding on a topic; however they also described verbally what they were drawing or writing down. The verbal explanations were included in the transcript and analysis.

The final questions in the interview schedule were included because they met the aims of the study and were non-directive and were open-ended. Thus, they were likely to encourage participants to talk at length. Interviews were tape-recorded and lasted as long as the child wished (from 25 to 50 minutes). How much was reported or expanded upon by each child varied, but the two longest interviews took place with the two oldest children from the sample. This is possibly indicative of these children

having a wider vocabulary, a greater understanding of the difficulties faced by their sibling and themselves in dealing and coping with their sibling, and a better understanding of the difference between their family and those with only “normal” children.

Analysis

Interviews were transcribed in full and common themes that emerged from each individual interview were identified and analysed after the interviews took place. It is acknowledged that there is no prescriptive right or wrong way to conduct and analyse interviews using IPA (Smith et al., 1999). The following results and conclusion are summarised using superordinate themes or constructs with subordinate factors (see Free, Ogden & Lee, 2005). In accordance with Smith’s (1996) guidelines, the importance of a theme was judged not only by how frequently it was mentioned by one or more participants, but also how the theme could help to explain other parts of the participant’s account.

The analysis gave some attention to commonalities in the experiences of the six children. Exceptions to the commonalities between participating children were also noted. Themes were identified by reading through transcripts a number of times to become familiar with the material. At the second read through, notes were made in the left-hand margin on initial thoughts and observations. These were then identified and labelled as emergent themes in the right-hand margin. In a new table, the themes were then grouped together into relevant concepts with specific examples alongside in another column, thus forming clusters of super-ordinate themes. Throughout the process references were constantly made back to the original text as part of an iterative process. When individual interviews had been analysed in this way,

comparisons and contrasts were made across interviews to identify shared and divergent themes.

Reflexivity

The interviewer (and first author) was a young adult female with a number of years experience working with families who have children diagnosed with ASC. She also had experience working with TD siblings in these families and supervising playtime between the ASC and typical child. As such, she was familiar with ASC tendencies and had some preconceptions regarding the triad of impairments the ASC child in the family would have and how this might shape the types of interactions and play that might be described by participants. However, in keeping with the approach to analysis used in IPA, she “bracketed” her preconceptions during data collection and analysis in an effort to ensure that the analyses were grounded in the accounts provided by participants.

It was recognised that children may have been reluctant to speak openly about all aspects of the sibling relationship and interactions, and they were not pushed to do so. Hence if a question from the interview schedule was not answered after one or two gentle prompts it was disregarded. Children varied widely in their explanations and accounts when answering the researcher's questions and some did not expand on points in very elaborate ways. They were asked for any examples they could think of to illustrate the points they made.

Results & Discussion

Children’s accounts were clustered around five themes. The super-ordinate themes included empathy and emotional contagion, the emotional reactivity of the sibling, a desire for harmony and togetherness, adjustment and resilience, and lastly,

an underlying theme of ambivalence- voicing positive as well as negative opinions regarding their sibling. Each of these themes is discussed below.

1. Empathy and emotional contagion: Feeling sad or happy when their sibling was sad or happy

When asked about a time when their sibling did something to make them happy, children reported on events involving their sibling being happy or able to do something, which in turn made them feel happy.

Interviewer (I): Can you tell me about something that you did when you felt happy and had a good time together?

RH (9yo): Erm, it's probably when we're at theme parks and stuff when he wants to go on all the rides and he doesn't know which one to pick first, and, um, it's like very exciting for him

This was somewhat unexpected, as the questions had been originally construed to mean when had the sibling done something to intentionally make the child happy. Thus it did not always seem to be events in which the ASC brother or sister had intended to be nice that came immediately to mind; rather emotional contagion occurred leading to positive emotions for the child. The same empathetic pattern of response was seen with negative emotions. When asked, "Can you tell me about a time when your sibling did something that made you feel sad?", responses often revolved around experiences of seeing their sibling sad or in another negative emotional state such as angry or frustrated. Sibling anger was usually linked to that same child being sad or frustrated and unable to express that negative feeling. It may be recognition of the source of the anger yet understanding the inability to express it that leads to the empathetic response of sadness for these children witnessing the

process.

2. Emotional reactivity and social distance of the ASC sibling

i) Negative emotions - mostly expressed as anger. As mentioned in part of the previous theme, descriptions indicated that children frequently saw their siblings becoming angry or frustrated, and that this was expressed in physically and verbally aggressive ways. Thus the sibling's sadness or frustration (negative emotions) tended to be expressed in violent outbursts rather than tears. This often led to the interviewee feeling frightened, and was connected with seeing autism as a mostly negative disability.

I: So, do you want to tell me a little bit about William?

JH (7yo): Ermm, if you really annoy him he'll really shout loudly.

I: The most difficult thing about living with him?

JH: When he's in a mood and he really shouts and gives me a headache... Um, it's when he's really angry

RH (9yo): Erm, when he gets in a mood, he sort of, hits out and kicks things and stuff, and so that's erm, not very nice...

EH (10yo): Sometimes he's really nice... But sometimes he's really grumpy, and he says he's not grumpy. Um, yeah, and he shouts. And stuff... if I want to stop [playing a game] then that makes him angry.

Interactions that revolved around their sibling being in negative emotional states were often difficult for these children to deal with and upsetting to witness. Some children were aware that this behaviour was due to an inability by their sibling to

express their feelings in any other (less destructive) way:

NH (13yo): Because she gets really angry because she doesn't have emotions like she can't like show, she's sad but she can't cry, and she can't be happy.

Children therefore tended to show a high level of awareness of their sibling's negative emotional states and traits. They often mentioned their sibling's frustration, or inability to cope with things that did not go their way, and that at times their sibling was incapable of properly expressing themselves. These often resulted in their sibling lashing out and in turn led to children feeling sad or frightened, in a sense leaving them vulnerable to the labile nature of their siblings. Indicated here too were worries and fear over the unpredictable behaviour.

RH (9yo): It's quite scary when he starts hitting you...

One child mentioned her brother being suicidal and threatening to kill himself with a knife, clearly a frightening and upsetting experience for this child.

RH (9yo): I just thought there was one moment when I was frightened of him [yeah?]. It was when he got a knife and started, like, pretending he was gonna kill himself and, he kept saying he was gonna kill himself...

ii) Autism as involving negative attributes. Children were asked what they thought ASC meant, the reason behind this being that any definition given would be primarily based on their first hand experience with their sibling. Not all interviewees knew what autism or ASC meant when asked outright. Although four out of six offered an explanation, all children could identify that their sibling was different or detached socially in some way, and some expressed a desire for them to spend more time in the

social family world. Those who gave answers usually included negative emotions like anger, and as such autism was seen in a negative light, hence the condition was associated with fairly negative attributes (e.g. being unsociable and angry):

JH (7yo): Umm, I think it means that, that he's angry a lot, and he's, um and he, he doesn't like things and is always naughty.

The above quote also indicates a lesser understanding of the brother's condition, i.e. "*always naughty*", and implies that this behaviour was seen as intentional or deliberate. Lower levels of understanding of ASC as a trait were more common amongst the younger children. One boy however, added that autism also involved his brother being very clever. Cleverness was in his view clearly a positive and admirable attribute.

3) Desire for harmony and togetherness

Perhaps because of the emphasis on negative emotions and social distance of the ASC child, participants generally expressed desires for their sibling to be less angry, to play with them more or to take part in family events. Age was also a factor in this, with some participants saying that they used to play games more when they were younger, i.e. before they or their sibling had grown too old for the games. For one girl whose ASC sister also had learning difficulties, there was regret and perhaps even grief at the fact that harmony and togetherness in terms of family outings could not be simply achieved. She grieved that any outing had to turn into a big event, planning and bringing supplies and things to placate her sister in case they were needed, yet she felt correspondingly upset and sad when there was a family event held that purposefully excluded her sister.

NH (13yo): Just doing something like maybe going down to the beach ...

you'd have to bring this bag full of stuff... I'd say 'but we're only going down for about half an hour'... But then you have to have it... When she... when she's not there... like, if she, if she's, if we're doing something quite family-like and like we go out on a walk, and she's not, because she can't go there you kind of feel, like, oh, just, couldn't she just kind of be normal and come out with us

Most expressed a belief that indicated if their sibling was not different and autistic they would be less angry, that they would play together more and life would be more harmonious. A desire for more happiness, playtime and harmony ran across all these siblings' accounts of their experiences, and the ASC itself seemed to be an "extra" part of their sibling rather than part of the sibling's basic identity. When asked if there was anything they would like to change about their brother or sister, children frequently indicated that they would like them to be less angry, to want to play with them more, or made reference to their sibling being "shut off":

I: Do you think that you would like him to be any different to how he is?

JH (7yo): Yeah, for like, like when he, for no more yelling at, when, when he does something wrong or something.

VM (7yo): The difficult thing is, sometimes I have to try to get her to play with me. Ha. And she doesn't want to.

RH (9yo): I wish we could like play more and without him getting into a strop, without him losing and stuff like snakes and ladders and stuff like that... I'd like him not to get into a strop as much.

ME (8yo): Uhm, I'd like to be on her, I'd like her to be a little bit more nicer to me

I: Uhuh, so, how would that make things different then?

ME: Um, normally play with me a little a little more, coz she hardly ever plays with me, she only really does on her Pokemon game.... She probably lives her life in Pokemon... And doesn't really spend time with us, she would normally spend time on her DS or Pokemon game. It's weird.

NH (13yo): No, no, she's in her own world most of the time [Yeah?] there's only a few times when you really can like do something with her.

4) Adjustment and Resilience

These siblings had clearly grown up adjusting their behaviour to suit the needs of their ASC sibling. For the oldest child interviewed there was an obvious appreciation that they would be quite different themselves if they had not grown up with their ASC sibling: their sibling had helped to shape their personality and development. One boy in particular showed an appreciation for the status quo by stating that he would not change his brother if given a chance to wave a magic wand and have him be "normal". This was evident amongst other children in an implicit way who, despite at times talking of wishing their sibling was not so angry or would play more, also said that there was not anything they would like to change about their brother or sister.

It is important to note that overall, children showed an appreciation of small yet positive things that occurred in their everyday lives. When good things or fun times occurred they were not taken for granted. Such occasions centred around the times

when they did play with their sibling, or when their sibling helped them complete a task.

ME (8yo): Well she um, helped me find my Gameboy when I didn't know where it was.

VM (7yo): Erm, She.. doesn't like playing with me that much... because, um, uh, well we have these special plastics things, and they're like um fairies and stuff and she doesn't like playing with them and it's like, Sarah could you please play with them... Sometimes... she says, when we're about to play she says um, you can choose a game of your own, and then she, she plays it with me

Importantly, a number of very typical sibling behaviour patterns were also reported. Times when they helped their sibling were also complemented by the reverse situation- the experience of their sibling helping them, often in a scenario requiring some computer-knowledge. This was seen in a positive light and resulting in a "fun time".

RH (9yo): Uh, yeah, when we were erm, playing on the computer with each other and he was actually helping me, erm, to, coz he knows more about computers than me and he was helping me do stuff.

ME (8yo): She's good at spelling, which I don't like, so she can help me with my spellings when I'm stuck on a word.

In addition, for half the children, reports of any embarrassing experiences with their siblings focussed on their sibling telling a secret about them, or teasing them -

this may have been done deliberately rather than simply being a faux pas associated with autism and a lack of understanding of social norms. For example, one boy talked about his sister finding and revealing the contents of his secret diary:

I: Has she ever done anything that made you feel embarrassed?”

ME (8yo): “Erm, She showed, well she told everyone, in her, well in her form what I’d writ in my diary.

i) Birth order reversal; “Sometimes I do feel like I’m the older one...”. Birth order reversal - younger siblings feeling like they were older than their ASC brother or sister rather than the other way around - was also part of this theme of adjusting. This was illustrated by the interviewees’ accounts of helping or coaching their older ASC siblings, spontaneous statements of feeling older than their siblings, and at times satisfaction in outsmarting or managing to get their own back on their older sibling. Many reports indicated that they had taken the role of an older, as opposed to younger sibling, and some voiced it outright.

NH (13yo): But with Kate I have to be so much more grown up [yeah] and so much more, you kind of have to just go in this zone if you like, help... It kind of hit me when I was a bit more, I was a bit grown up that, actually wait, she’s my sister, I have to, do something to help [yeah] and so I kind of grew this other side of me, [yeah] which had a, good impact I hope...

RH (9yo): I do sometimes... coz, I don’t know I just do sometimes feel like I’m older than Ben.

These were mostly positive interactions (e.g., helping behaviour), although

this did also at times lead to conflict. For example, one girl found it difficult and saddening when her brother was frustrated and angry at himself for not being able to do something which she could easily succeed in (and therefore required her help), or when she did not respond fast enough to his requests.

I: What about sad, has he ever done anything that's made you feel sad?

RH (9yo): Erm, It's probably when he keeping saying that 'I'm an idiot I can't do nothing I go to an idiot school'. And stuff like that, and um, like, yeah stuff like that, when I say I can do something and he says- 'Well I can't do that coz I'm an idiot'.

ii) Flexibility - Adjusting to the level and desires of the ASC sibling. Children often described situations that implied a bossy dominance on behalf of the sibling in prescribing the terms of play activities and whether or not a game continued.

JH (7yo): When last night when I wanted to play on my Wii, William wanted to play another game and so in the end he played another game, so then I was watching programs on TV and then I said 'When this finishes I'll come to play'. And so when it finished I went upstairs with my game and he would not let me play it... then I just watched him and sometimes I went, I went into my room to watch TV a bit and then I comed in and asked if I can play with him so I played with him- that's when he yells.

Irritation of this sort seemed to be subsumed by the overall desire to interact with their sibling. Hence there was an underlying theme of the typically developing child adjusting to the needs and wants of the ASC sibling in order to get some play-time together or to interact with them. Many scenarios described seemed to be

interpreted by the participant as only occurring on their sibling's terms. Examples included sitting with a sibling while they played on the computer, or playing what their sibling wanted to play, and only sometimes getting to do things together that they chose.

EH (10yo): I'm watching him on the computer, and erm, he just does really boring stuff... and like, and I say... please can you go on something interesting he's like, NO! [or playing a game?] it just goes along the line of what, he wants, usually.

I: Can you tell me about any good games that you play together?

RH (9yo): Uhm, probably like on the computer and stuff like when he's like playing a game and showing an interest into it and he asks me to help him and stuff, [yeah] with like, reading, and, I like to help and, that's like, good for us...

I: Can you think of a time that you did something that made Sarah feel happy?

VM (7yo): Mmm, let's see, er, ah, mmm, let's say... I play her game that she wants to play..? And uh, when sometimes I think it's boring I still play it...

Like, she really likes *"Guess who?"* and I don't and I still have to play it.

For one boy this was also evident in conversations, which he described as mostly being his brother talking and him listening and being bored, but still listening nonetheless.

I: Do you talk with Chris a lot?

EH (10yo): Yeah, quite a lot yeah... It's usually about stuff he wants to talk about, not stuff that, doesn't, really interests me but mostly, yeah we do talk

lots.

This description was not unsurprising given that the triad of impairments characterising autism involves a lack of awareness in social interactions and therefore often results in children with ASC talking at rather than “with” other people. One girl also reported that she liked playing computer games with her brother because that was the time when he became more talkative and interactive with her. The fact that he became interested in the world was, for her, a positive experience and way to connect socially with him.

RH (9yo): Um, when he’s like, on the Wii, he he’s um, he sort of like talks to me and he gets, erm, he like starts getting really interesting and he starts talking and it’s like him being interested in something, which is a very, which is a change.

Preferences for the kinds of activities or games that were played also indicated that the ASC child was “directing” the interaction, with the TD child adapting to this. Reflecting the triad of impairments, imaginative games were rarely mentioned. Interactions most often centred around predictable and rule bound activities such as board games, computer tasks/activities and video games such as Nintendo DS (a hand held video game), Nintendo Wii or Playstation (both of which connect to a TV set). It was these rule bound and predictable activities that were remembered and reported mostly as being fun, positive interactions. This presumably is due to them being common ground, that is, common activities that are enjoyed particularly by children with ASC (due to the preference for systematising and the predictability of technology) but also by many TD children.

I: OK, can you think of... tell me about some good games you play together

ME (8yo): Well, we normally, sometimes we go on the Playstation 2 we have. I normally give her a rugby or football match coz I have a rugby game and football game. Umm. And I normally beat her all the time...

I: Do you ever play any imaginary game together? Or board games?

ME: Well we play board games, only sometimes, but, never really any imagination games, not that.

One girl whose ASC sister also has learning difficulties felt that she particularly adjusted down to her sister's level, as every interaction had to be supervised and included activities appropriate for much younger TD children (e.g. watching and singing along together to the theme-song from a children's television program called "Postman Pat"). For many children it seemed like it had been easier to play together at younger ages, i.e. at a lower and less cognitively demanding level.

I: Ok, so can you think of a time when you had a good time together? Or like, an example of something you do together that's fun?

NH (13yo): Erm, we sometimes, watch "Postman Pat" together, erm because she LOVES "Postman Pat", and I know the signs to "Postman Pat". So you can sing it while singing the song, and you do it and she, and she claps her hands and sh-li- when it goes away, erm, letters from, wait, ring, and letters through your door, when she rings, her hand would go like that to your finger and I think that's really cute... when I was younger I could do so much more...

There was one slight exception to this theme, and that was one child's account of how they bribed their brother to play with them.

JH (7yo): I said, 'I might give you more money, only if you're nice to me'.

Again however, this could be interpreted as part of a predictable system, albeit one based on incentives and a tangible reward rather than a desire to interact for the innate pleasure of it. In addition, the interactions within this pair were still reported as revolving mainly around technology/computer games, thus the bribery may be an attempt to have things more on their terms than those of the sibling.

iii) Acceptance. Most children expressed some unconditional acceptance of their sibling, and there often seemed to be recognition and knowledge that they (and their sibling in turn) would be different people without the precise situation. This indicated that they were seeing the positive side of having a sibling who was 'different', and hence an appreciation of the particular family dynamics and constellation involving a child with ASC.

RH (9yo): I just think how he is is, fine really

EH (10yo): If someone just came up to me and said, "I can grant you one wish, it will be I can turn Chris into a normal person without Asperger's, blah blah blah blah blah, do you want him to be changed?", then I'd say, "No".

NH (13yo): Well you sort of have to be [mature] because without being, if you don't understand, If you don't like, have the respect you seriously could be like, weird, you could be one of those weird people, who I don't like... Sometimes I just run into my room and cry and just wish so much, and, you kind of have to just say, it's what it's 'sposed to be... isn't it...

However, as indicated in the last quote, this acceptance was not always easy, and children still had very strong emotional responses to their experience of having an ASC sibling.

5) *Ambivalence*

Ambivalence was also an underlying theme in these interviews. Children often expressed one opinion or feeling when answering one question about their sibling and then another on the opposite end of the continuum when answering another question. This was evident in descriptions of loving yet at the same time hating a sibling:

NH (13yo): I sometimes say I HATE her, but I just sometimes feel how can you hate someone when they don't mean it... I think, it's OK to hate her but you don't actually mean it you just sometimes get so annoyed that you... think you hate her but you don't, you can't hate someone that you actually love.

Ambivalence was also expressed when interviewees said that they wanted their sibling to change and be more 'normal', yet also stated that they would not wish them to be any different to how they are.

NH (13yo): ...you kind of feel, like, 'Oh, just, couldn't she just kind of be normal and come out with us?' ... Because I like her, but she can't... and, you kind of wish she can.

Although interviewees accepted their sibling's ASC as a static and unchangeable trait, and expressed a desire to spend more time together, it was also at times a source of frustration for the child and led to feelings of wanting to be alone. Thus, most children expressed a desire and need to have their own space away from their sibling, for example, by wishing they could disappear and reappear at will.

EH (10yo): It's... pretty good, living with, him. Erm, sometimes there are times when I wish I could just do that [clicks fingers] and he's gone and do that [clicks fingers] and he's back.

NH (13yo): I sometimes wish, could she just like, not be there...

VM (7yo): Yeah, she gets on my nerves... I went, "Can you go away please?"

This theme of ambivalence was also linked with the curiosity on behalf of a few siblings. For example, despite accepting the situation they still spent time wondering what their sibling would be like if they didn't have a disability.

NH (13yo): Would she be very tidy [yeah] or would she be very messy, or would she be funny or, or would she be very clever or would she be, a bit, dumb, or would she be popular or unpopular? There's just so many questions you want to know about her but you can't...

Conclusions and Implications

The summary of interviews presented coincides with some themes outlined in previous qualitative studies interviewing siblings of children with ASC or other disabilities. These include, for example, witnessing violent outbursts, physical aggression and mixed (or ambivalent) emotions (Mascha & Boucher, 2006; Konidaris, 1997), a sense of compassion and warmth and tolerance (Powell & Ogle, 1985) and feeling frightened at times (Benderix & Sivberg, 2007). Play and interactions were mainly on the ASC child's terms, often with computers, video games or other technology, and usually occurred due to a strong desire for interaction

within the children being interviewed. Less positivity has been reported amongst ASC sibling pairs than TD sibling pairs in some quantitative studies (e.g. Kaminsky & Dewey, 2001). There was some support for this here, shown by the desire for more harmony and play. Because positive interactions seemed to revolve around technology and computers, it may be that encouraging these activities could foster positivity in sibling relationship quality. Burton & Parks (1994) indicated that siblings attempt to find a balance between their own needs and those of their brother or sister, a finding supported by this study's theme of adjusting to the needs of the ASC sibling and the clear desires of all children to interact with them. Qualitative accounts of mothers of children with ASC also indicate that a willingness and need to be flexible is an important coping strategy in day-to-day life (Marshall & Long, 2010). One theme from the present interviews which has not received attention in previous studies was emotional contagion: reports of feeling happy at times when their sibling with ASC was happy, and conversely sad when their sibling was in a negative emotional state (be it sad or angry). Children may thus be vulnerable to the labile nature and negative emotions of the child with ASC, particularly given that they often reported anger and frustration being expressed by their brother or sister. These children would therefore benefit from strategies to help cope with a sibling's negative moods or outbursts.

Children made consistent references to their ASC sibling's negative emotions and their own desire for greater harmony. Mothers of children with ASC have also expressed desires for integration and 'normal' interactions but acknowledged the difficulties in achieving it (Marshall & Long, 2010). Understanding that this experience is likely shared by family members could have implications for the type of support offered to families of children with ASC.

As expected, longer interviews took place with older children, perhaps indicating better recognition of the severity of their sibling's disability and reflecting their own greater understanding. It may also reflect older children's greater capacity to communicate verbally with a stranger. Any support for children with ASC siblings must recognise this and be age-appropriate. Children desired more harmonious interactions with their ASC sibling, yet younger children were less able to understand the reasons behind their sibling's behaviour. This could perhaps be facilitated by structured playtime with adult or therapist supervision. Clearly explaining to children the reasons behind any oddities or aggression displayed would help in aiding their understanding of why the aggressive behaviour is occurring. In practical terms, families should also consider the need for space and time away from the child with ASC, i.e. a "safe place" for the typical child to take refuge.

It was noted by the interviewer that these children, particularly the oldest two, were very happy to talk about their sibling and be listened to, indicating a feeling of empowerment through talking about their experiences. Although the interviews were fairly brief, taking part in a one-to-one scenario with an older person who genuinely wants to listen may be preferable to or enhance experiences of social support through larger groups such as ASC-sibling support groups. Given the ambivalent feelings held by the children in these families, e.g. expressing acceptance of their sibling's condition at the same time as wishing things could be different (e.g. "I wish he would play with me more"), having a sympathetic listener who validates their feelings and reassures them that it is acceptable and "OK" to (for example) love and hate their brother or sister may be of benefit. It may also be helpful to show children such as these that other people feel similarly mixed emotions or have similarly mixed thoughts regarding their siblings. This may then foster an even more mature outlook

and appreciation of the unique family situation, and also help children to be more open about their own emotions. In turn, this could help parents to be more aware of their typical child's thoughts or feelings and therefore respond more sensitively and appropriately. It may in addition help families themselves to assert their needs and seek outside help, reducing stress and potential impact of this on typical siblings. Communicating helpful strategies for detaching from and coping with their sibling's frustrations or anger at times may also be beneficial in reducing stress in families where anger features prominently as part of the ASC sibling's modus operandi. If it is not addressed, such stress has the potential to contribute to psychological distress and adjustment problems (Sanders & Morgan, 1997).

It is recommended that future studies delve more deeply into possible differences in experiences where a sibling has only a diagnosis of ASC compared to where the ASC is co-morbid with other learning difficulties and children who are also non-verbal (although recognising that here many themes still overlapped), and also accommodate the growing realisation and resolution regarding the status quo that may be related to age differences. Research is usually conducted from an outsider perspective and uses parental or observer ratings, which may be overly sensitive to negative situations (Bishop, Maybery, Wong, Maley, & Hallmayer, 2006). However these children reported firsthand experience of many stressful and difficult situations. It is likely that the difficulties mentioned by children in the present study are similar for other families with ASC children (Carrington & Graham, 2001). It is not known whether negative interactions affect the sibling in a longer lasting way, and it may therefore be important to address this issue in future research. Such further research could focus on asking children what extra support they would like from either outside or within the family.

Article 2:

Are different observable autistic traits linked to positivity and negativity in sibling relationship quality?

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Abstract

We examined sibling relationship quality (SRQ) amongst typically developing (TD) dyads and those where the older sibling (OS) had an autism spectrum condition (ASC). Specific autistic traits were tested as mediators of this association in a sample of 33 ASC and 50 TD families. Mothers reported on both children's SRQ and autistic traits (attention to detail, imagination, social skills and mind reading). ASC families reported less SRQ positivity and higher negativity. Impairments in imagination mediated the link between family type and positivity, while impaired social skills and mind reading mediated the link between family type and negativity. Different autistic traits may be responsible for negativity compared to positivity in SRQ; potential implications for TD children with ASC siblings are discussed.

Theoretical background

Sibling relationships have important consequences for the social and emotional development of children (Dunn, 1988). It is therefore pertinent to examine whether these relationships differ when one child in the sibling pair has a disability, such as an autism spectrum condition (ASC), and the individual factors relating to the child with ASC that may be responsible. It is generally considered useful to conceptualise autistic traits as dimensional rather than categorical, with heritability studies indicating that distributions of traits (in terms of their behavioural manifestations) belong to a continuum between the general population and those reaching diagnostic criteria for ASC (Baron-Cohen, Wheelwright, Skinner, Martin, & Clubley, 2001). Any ASC represents variations in manifestation of the triad of impairments (Ronald et al., 2006). There are only modest correlations between the component triad areas amongst both the general population and those with ASC, thus indicating phenotypic independence (for example, social and non-social behaviours, are only modestly correlated although both associated with autism) (Ronald, Happe & Plomin, 2005), suggesting that these behavioural traits from the triad should be considered separately. The present study sought to examine how the sibling relationship quality (SRQ) differs in families where an older child has ASC compared to families with two TD children, and extends previous research by specifically investigating which ASC related traits- imagination, mind reading, social skills and attention to detail- can account for any differences in SRQ.

Sibling relationships are characterised by both positive and negative aspects existing side by side. Positivity in the relationship involves warmth, caring, intimacy, and playing together, and has been linked with children developing more prosocial behaviours amongst peers (Downey & Condron, 2004) and greater socio-emotional

understanding (Howe, Aquan-Assess, Bukowski, Lehoux, & Rinaldi, 2001).

Negativity in the relationship, for example, fighting, hostility, rivalry, jealousy or competition for parental attention, also has consequences. Some may be detrimental for a child, potentially contributing to aggressive behaviour or adjustment problems (Patterson, 1986), and some more beneficial, for example arguing with a sibling can foster social understanding and appreciation of another's point of view (Herrera, & Dunn, 1997).

The term ASC encompasses a variety of developmental disorders from pervasive developmental disorder (PDD), to autism and Aspergers Syndrome, and may affect up to 57 children per 10,000 (Scott, Baron-Cohen, Bolton, & Brayne, 2009). Autistic traits fall into three categories known as the triad of impairments, which covers social interactions, impairments in communication and repetitive and stereotyped interests (American Psychiatric Association, 1994). These can be conceptualised in a quantitative manner as involving impaired imagination, impaired social skills, impaired mind reading skills, and attention to detail (Auyeung, Baron-Cohen, Wheelright, & Allison, 2007). The first three mentioned traits represent the social and communication domains, whilst the last (attention to detail) relates to the third area of the triad.

In their review of interpersonal relationships in autism, Travis & Sigman (1998) described the research on siblings of children with ASC with the opening sentence "little is known about sibling relationships in autism" (p.70). Ten years on the picture remains unclear, with indications of both positive and negative effects on TD siblings. Knott, Lewis & Williams (1995) looked at autistic sibling relationships and found that children with autism responded to and initiated fewer social interactions than do TD siblings, but these children interact relatively more with their

siblings than they do with peers. Thus it has been suggested that TD siblings may provide an important intermediate and familiar step in any interventions designed to build upon peer relations in children with ASC (Travis & Sigman, 1998). Positive findings regarding the sibling relationship in ASC families include more admiration, satisfaction and acceptance within the relationship by the TD sibling (Kaminsky & Dewey, 2001; Rivers & Stoneman, 2008; Roeyers & Mycke, 1995). Fisman & colleagues (1996) found that TD sibling pairs actually reported more conflict (negativity) and less warmth (positivity) in the sibling relationship than those where one sibling had either Down's syndrome or PDD.

On the other hand, research into the area has also highlighted negative impacts on the TD sibling and SRQ. These include a significantly lower frequency of dyadic interactions and siblings voicing feelings of being burdened, lack of closeness, isolation and loneliness (Bägenholm & Gillberg, 1991; Knott et al., 1995; Opperman & Alant, 2003). Kaminsky & Dewey (2001) found that children reported less pro-social behaviour and nurturing, and thus less positivity, in their relationships with their autistic sibling than did those with TD siblings. Interestingly there was also significantly less negativity reported, which included factors such as competing and quarrelling with their sibling.

Given the mixed findings of several previous studies it is relevant to look specific characteristics or traits that might contribute to SRQ amongst ASC families. As mentioned, recent findings have indicated that children with ASC differ in terms of the severity of each of the aspects that make up the autistic triad of impairments. Relatives and siblings of autistic children may be affected by these to varying degrees, with impairments in one domain referred to as the broad autism phenotype, and two referred to as the narrow autism phenotype (Bolton et al., 1994), and thus

their autistic traits should also be taken into account. Since two of these impairments relate to social functioning (social interaction and communication related impairments) and these are core aspects of meaningful human relationships, elevated scores for these particular impairments may be key to SRQ.

The aims of the present research were to examine SRQ in families where an older child had a diagnosis of ASC, and to investigate which particular aspect of autistic traits, deficits in social skills, deficits in imagination, deficits in mind reading ability, and attention to detail, of the ASC children were related to positivity and negativity in SRQ. It was hypothesised that overall there would be less positivity but not necessarily a difference in negativity in SRQ in ASC families than in families with two TD children. More specifically, we hypothesised that more pronounced deficits in imagination, mind reading and social skills would be associated with lower positivity in SRQ, and that deficits in social skills would also be associated with more negativity in SRQ. Impairment in these areas was hypothesised to mediate differences in SRQ found between family types. We further hypothesised that the non communication-related aspect of autistic traits, attention to detail, would not be associated with SRQ.

Method

Sample and Recruitment Criteria

For the target group, the older sibling (OS) had a prior medical diagnosis of an ASC and the younger (YS) had no history (diagnosis or suspected diagnosis) of ASC or related disorder. Children from control families had no history of ASC or related disorder. Mothers completed questionnaires with reference to the two siblings closest in age within the bracket of 4 and 13 years (maximum 5 years age-gap).

Target Families: Those with an ASC child and a TD sibling:

Families with an ASC child were approached in a number of different ways, since as described by Rivers & Stoneman (2008), it was necessary to conduct non-random purposive sampling because there is a relatively low incidence in the general population of target families. Local schools in South East England with ASC units or integration policies were contacted by email, letter or phone and asked if they would pass on information letters to potential families and an advertisement was placed on the National Autistic Society website. Parent ASC support groups were contacted and asked to disseminate information letters regarding the study (30% of target families were contacted this way), and leaflets advertising the study were sent to families of newly diagnosed children with ASC registered at a local NHS primary care unit. Families received an information letter regarding the study, with contact details. Ten percent of families receiving information letters responded and were sent questionnaires. These were returned to the researcher in a reply paid envelope. Snowballing (see control family recruitment) was also used as a method of contacting the ASC families. Thirty-two were two parent households and 1 was a single parent household.

Control condition families- those with two TD children:

Two-thirds of the control group were contacted via their previous participation in the Sisters and Brothers Study (SiBS) (Pike, Coldwell, & Dunn, 2006). This originally involved recruitment through schools also in the south east of England. Forty-four were two parent households and 6 were single parent households. Other control condition families with comparably aged siblings were recruited by emails, word of mouth and snowballing (each family was asked to recommend another family

with similarly aged children who might be willing to partake in the study and could be contacted by the researcher), and advertisements. As above, families who opted in to the study by contacting the researcher were sent a questionnaire booklet and reply paid envelope.

In total eighty-three families participated in the study. The ASC group consisted of 33 families. Five children with high functioning autism also had co-morbid dyspraxia or learning difficulties. The remaining 28 reported having an OS with a diagnosis of autism (4), high functioning autism (16) or Asperger's Syndrome (8). Dyads consisted of 17 boy-girl pairs, 9 boy-boy pairs, 3 girl boy-pairs and 4 girl-girl pairs. Fifty families made up the control group. Dyads consisted of 9 boy-girl pairs, 18 boy-boy pairs, 14 girl boy pairs and 9 girl-girl pairs. There was no significant difference in annual income level between the control and ASC families.

Measures

Autistic Traits. Mothers completed the Autism Quotient (AQ), which is a 50 item self-report questionnaire assessing autistic traits or tendencies (Baron-Cohen et al., 2001). Mothers also completed the child version of the AQ questionnaire for both the younger and older sibling (AQ-Child- Auyeung, et al., 2007). The AQ has been shown to differentiate between those diagnosed as on the autism spectrum in clinical interviews, and normal controls, and shows good inter-rater and test-retest reliability (Baron-Cohen et al., 2001). In this sample reliability was good, with Cronbach's alpha ranging from .87 to .94.

The AQ comprises four subscales; social skills, mind reading, imagination and attention to detail (Baron-Cohen et al., 2001). Response options are on a four point likert scale ranging from 0 (= definitely disagree) to 3 (= definitely agree), with

higher scores indicating higher levels of autistic traits.

Sibling Relationship Quality. To measure sibling relationship quality, a modified 14-item questionnaire version of the Maternal Interview on Sibling Relationships (Stocker, Dunn, & Plomin, 1989) was used. Mothers rated how often their children display behaviours relating to the sibling relationship (for example, playing together, companionship, sharing, quarrelling or competing) on a likert scale ranging from 0 (*almost never*) to 5 (*regularly*). Scores were averaged to obtain a mean positivity and mean negativity score for each dyad. Cronbach's alpha indicated there was good reliability for both positivity (.89) and negativity (.73) scales.

Results

Three sets of analyses are presented, initially examining any overall differences between families with and without an OS with ASC. Correlations were then conducted to determine which of the AQ subscales were associated with SRQ, and this was followed by tests for mediation by specific autistic traits for positivity and negativity in SRQ.

Between Group Comparisons: SRQ and AQ

The two family types were compared in a series of t-tests on demographic characteristics such as age, total AQ scores for all family members and negativity and positivity in SRQ. A summary is presented in Table 1. ANOVAs determined that there were no significant effects of sibling sex constellation on negativity or positivity in SRQ, and there was no significant correlation between age or age difference on negativity or positivity in SRQ.

Mothers with a child with ASC reported significantly less positivity than

mothers with two TD children. There was also a trend towards these families reporting more negativity in SRQ. The two family types also differed significantly on AQ scores. OS in ASC families scored significantly higher on the AQ than older siblings from TD families. Contrary to expectations, YS in ASC families scored significantly lower on the AQ than YS from TD families. In addition, T-tests indicated that there were significant differences between family types in each of these subscales apart from YS Imagination (all $ps < .05$).

Table 1: Mean (with SD) for age, AQ and SRQ positivity and SRQ negativity, and for older and younger siblings on AQ subscales.

	Family Type		<i>t</i> -value
	Family with an OS ASC	Both children	
	Child	TD	
	N= 33	N= 50	
Mother Age (years)	41.74 (5.66)	41.60 (4.84)	.12
Father Age (years)	44.08 (5.89)	43.56 (5.23)	.25
YS Age (years)	7.30 (2.16)	8.24 (2.74)	-1.66
OS Age (years)	10.09 (2.32)	10.42 (2.53)	-.60
Mother AQ	40.81 (16.53)	45.86 (13.25)	-1.54
Father AQ	50.51 (22.57)	47.66 (25.45)	.47

YS AQ	34.45 (15.09)	45.88 (14.87)	-3.41**
OS AQ	100.33 (18.36)	45.70 (17.12)	13.82**
SRQ Positivity	2.45 (.79)	3.09 (.79)	-3.60*
SRQ Negativity	2.57 (1.03)	2.17 (1.01)	1.78 ^t
YS Impaired			
Mind Reading	12.12 (7.18)	16.72 (7.05)	-2.89**
YS Attention to Detail	7.75 (4.72)	10.50 (4.97)	-2.51*
YS Impaired Social Skills	7.24 (4.78)	11.20 (5.24)	-3.41**
YS Impaired Imagination	3.18 (3.58)	3.80 (3.61)	-.77
OS Impaired Mind Reading	36.45 (6.91)	14.86 (7.11)	13.69**
OS Attention to Detail	18.21 (5.87)	10.90 (5.97)	5.50**
OS Impaired Social Skills	30.15 (7.91)	11.16 (6.54)	11.91**
OS Impaired Imagination	12.39 (4.62)	4.22 (3.96)	8.61**

Note. Higher AQ and AQ subscale scores indicate higher degrees of impairment. ^t $p =$

.06, * $p < .05$, ** $p < .01$

Associations between component autistic traits and SRQ

In order to assess the associations between autistic traits and SRQ, correlations were calculated for the sample as a whole. As can be seen in Table 2, higher AQ scores for OS were associated with lower levels of positivity in SRQ and higher levels of negativity. AQ scores for the YS were not significantly related to either positivity, or negativity in SRQ.

When looked at separately, the pattern of results differed slightly for the two family types. There was a significant difference between the correlation coefficients for YS AQ total scores and positivity between the two family types ($z = 2.03, p = .02$). For ASC families, higher YS AQ scores were associated with more positivity in SRQ (see Table 2), but the opposite pattern to that was seen for TD families. This unexpected finding for the ASC families led us to examine the possibility that sibling similarity in autistic traits might facilitate positive interactions. To test this, a post-hoc difference score was calculated to determine whether dyads similar in terms of AQ level had more positivity in SRQ. Across the whole sample, a larger AQ difference score did correlate significantly with both lower positivity ($r(81) = -.40, p < .001$), and greater negativity ($r(81) = .25, p < .05$). To further check this explanation, a post-hoc partial correlation, controlling for difference in AQ total scores, determined that across the sample and for families with OS ASC, the correlations between YS AQ score and positivity were no longer significant ($r(80) = -.08, p = .46$, and $r(30) = .17, p = .37$ respectively). This indicates that controlling for the difference in AQ scores did indeed account for the unexpected positive correlation found between YS AQ score and positivity in SRQ amongst these families.

Similarly, in ASC families, lower social skills of the YS were significantly correlated with more positivity in SRQ. There was a significant difference between the correlation coefficients for YS Social skills and positivity between the two family types ($z = 1.72, p = .04$). Again, a post-hoc difference score was calculated to determine whether dyads more similar in terms of social skill level (i.e. those with a similar level of deficit in this area) had more positivity in SRQ. Across the whole sample, a smaller difference score correlated with more positivity ($r(81) = -.47, p < .01$), and was a particularly strong association for the OS-ASC families ($r(31) = -.65, p < .01$). To further check this explanation, a post-hoc partial correlation, controlling for difference in social skills score, determined that across the sample and for families with OS ASC, the correlations between YS social skills and positivity were no longer significant ($r(80) = -.004, p = .97$, and $r(30) = .12, p = .52$ respectively).

Table 2: Across and within family group correlations

	Total Sample		ASC Families		TD Families	
	(N= 83)		(N= 33)		(N= 50)	
	SRQ Positivity	SRQ Negativity	SRQ Positivity	SRQ Negativity	SRQ Positivity	SRQ Negativity
OS AQ	-.40**	.31**	-.15	.32	-.18	.23
OS IMR	-.44**	.30**	-.28	.40*	-.22	.16
OS ISS	-.42**	.31**	-.38*	.26	-.08	.26
OS II	-.42**	.28**	-.06	.21	-.38**	.19

OS AD	-.07	.16	.25	.07	.09	.07
YS AQ	.18	-.004	.33**	.06	-.13	.08
YS IMR	.09	.11	.31	.16	-.25	.21
YS ISS	.25**	.00	.38*	-.08	.00	.17
YS II	-.11	.00	-.09	.13	-.20	-.05
YS AD	.25*	-.17	.30	-.04	.09	-.18

Note. OS AQ= total score for OS on Autism Quotient, OS IMR= score for OS on impaired mind reading subscale, OS ISS= score for OS on impaired social skills subscale, OS II= score for OS on impaired imagination subscale, OS AD= score for OS on attention to detail subscale, YS AQ= total score for YS on Autism Quotient, YS IMR= score for YS on impaired mind reading subscale, YS ISS= score for YS on impaired social skills subscale, YS II= score for YS on impaired imagination subscale, YS AD= score for YS on attention to detail subscale.

* $p < .05$, ** $p < .01$

Mediation analyses

After establishing that there was a relationship between family type and SRQ, we examined whether this was due to specific OS autistic traits. Thus we tested whether autistic traits in terms of impaired imagination, mind reading and social skills mediated the relationship between family type and SRQ, using a series of multiple regressions carried out in the manner outlined by Baron & Kenny (1986). According to Baron & Kenny (1986), mediation is indicated by a decrease in the predictive value of the independent variable (family type) on the dependent variable (SRQ positivity

or negativity) when one of the proposed mediator variables (the AQ subscales) is included in the regression equation.

Significant correlations were found for all OS subscales and aspects of SRQ apart from attention to detail (using a one-tailed test) (see Table 2). Higher impairments in mind reading ability, social skills and imagination were all significantly associated with lower positivity and higher negativity in SRQ. As a result, only the three significant variables were included in the tests for mediation. For the regression models each was tested separately as a mediating variable as correlations amongst predictor variables were substantial. The standardised beta weights are shown in Table 3 for AQ subscales and positivity in SRQ, and Table 4 for AQ subscales and negativity in SRQ.

As can be seen in Table 3, each variable appeared to mediate the relationship between family type and positivity in SRQ. For example, family type significantly predicted impaired imagination (step one) ($\beta = .69, p < .05$) and family type significantly predicted positivity in SRQ ($\beta = -.37, p < .05$) (step two). When impaired imagination was added into the equation with family type, family type was no longer a significant predictor of positivity in SRQ ($\beta = -.16, p > .05$) whilst impaired imagination was ($\beta = -.31, p < .05$) (step three). Similarly, for negativity in SRQ impaired imagination, social skills and mind reading also appeared to act as mediators (see Table 4).

A Sobel test, which more formally assesses mediation by testing the null hypothesis that the mediated effect is zero (Sobel, 1982), indicated that three of the six tests of mediation were statistically significant. Impaired imagination was confirmed as having a full and significant mediational effect on the relationship between an ASC child in a dyad and positivity in SRQ ($z = -2.40, p = .02$).

Significant full mediational effects were also confirmed for impairments in social skills on having an ASC sibling and negativity in SRQ ($z = 2.62, p = .01$), and for impairments in mind reading on having an ASC sibling and negativity in SRQ ($z = 2.28, p = .01$).

Table 3: Standardised beta weights for multiple regression analyses testing for AQ trait mediation and positivity

Regression Model	IV (β)	Mediator (β)	r^2
Impaired Imagination			
IV = MED	.69**		.48
IV = DV	-.37**		.14
IV + MED = DV	-.16	-.31**	.19
Impaired Social Skills			
IV = MED	.80**		.64
IV = DV	-.37**		.14
IV + MED = DV	-.11	-.33*	.18
Impaired Mind Reading			
IV = MED	.84**		.70
IV = DV	-.37**		.14
IV + MED = DV	-.03	-.41**	.19

Note. IV = independent variable (ASC child in the family vs two TD children); MED = mediator (AQ subscale); DV = dependent variable (positivity in SRQ). * $p < .10$, ** $p < .05$

Table 4: *Standardised beta weights for multiple regression analyses testing for AQ trait mediation and negativity*

Regression Model	IV (β)	Mediator (β)	r^2
Impaired Imagination			
IV = MED	.69**		.48
IV = DV	.19*		.04
IV + MED = DV	.01	.27*	.08
Impaired Social Skills			
IV = MED	.80**		.64
IV = DV	.19*		.04
IV + MED = DV	-.14	.42**	.10
Impaired Mind Reading			
IV = MED	.84**		.70
IV = DV	.19*		.04
IV + MED = DV	-.19	.46**	.10

Note. IV = independent variable (ASC child in the family vs two TD children); MED = mediator (AQ subscale); DV = dependent variable (negativity in SRQ). * $p < .10$, ** $p < .05$

Discussion

The purpose of the present study was to compare SRQ in families with an older sibling who has ASC and families with two TD children, particularly with regard to the relevance of different observable autistic traits. In summary, increased autistic traits of older siblings were significantly associated with lower levels of positivity and somewhat higher levels of negativity in SRQ. Distinct components of autistic traits mediated the link between autism in the dyad and SRQ both for negativity and

positivity. This discussion will consider the potential of these results to explain previous mixed findings regarding sibling relationships in ASC families. In addition, the relevance of our findings to TD children will be considered.

In line with expectations, mothers' perception of positivity in SRQ was significantly lower in families with an OS-ASC than for families with two TD children. Results also suggested slightly more negativity in SRQ in families with OS-ASC, in line with Knott et al (1995) and Bågenholm & Gillberg (1991). Significantly lower positivity but not negativity in SRQ was found amongst ASC dyads by Kaminsky & Dewey (2001). This discrepancy regarding negativity may be due to the fact that the majority of their families were YS-ASC and the TD sibling in the dyad older (aged between 8 and 18 years) than in the present study. Pike, Coldwell, & Dunn (2005) suggested that for TD families, older siblings are more dominant in the sibling relationship and thus it is the OS characteristics that have greater influence on the quality of interactions. Since a child with ASC is also likely to be less flexible or adaptable (Wing, 1992) and therefore "dictate" the nature of the interactions, YS of children with ASC may be particularly vulnerable to the actions and behaviours displayed by their older siblings.

When considering autistic traits from a dimensional viewpoint, dyads in which older siblings with higher total AQ scores were reported as having significantly less positivity and more negativity in SRQ, indicating that autistic traits link with interpersonal relationships amongst siblings. Our hypotheses regarding the specific autistic impairments and SRQ were also supported. Across families, higher impairments in social skills, mind reading ability and imagination of the OS were significantly correlated with less positivity and more negativity in SRQ. For YS there was a small significant correlation between the AQ subscale attention to detail, the

only subscale to relate to non-social behaviours, and positivity in SRQ. Contrary to our expectations, a higher level of autistic traits amongst the YS in ASC families was associated with more positivity. Post-hoc analysis supported our proposal that if children in an ASC family are more similar in broad autistic traits, then this may facilitate more positive interactions. Overall, these findings contribute to a number of previous studies showing links between autistic traits and personal relationships, including links between higher autistic traits in the general population and interpersonal deficits (Jobe & Williams 2007), lower interpersonal skills such as nonverbal sensitivity (Ingersoll 2009), lower frequency and quality of friendships (Piven, Palmer, Jacobi, Childress, & Arndt, 1997), and (for men) lower relationship satisfaction with their partners (Pollman, Finkenauer & Begeer, 2009).

Tests of mediation indicated that only imagination impairments mediated the relationship between having an ASC child in the family and positivity in SRQ. Impairments in social skills and mind reading ability (but not imagination) mediated the relationship between family type and negativity in SRQ. It makes intuitive sense that imagination ability would be important for building positive interactions between siblings (e.g., thinking up pretend games to play), but not relate to negative interactions, which might result from an inability to understand another's point of view or initiate pro-social behaviour. The significance of each of these aspects of autistic traits as mediating factors may therefore help explain some differences in previous findings regarding SRQ and families where one child has ASC. These findings also support suggestions by Ronald et al. (2005) that each area of the triad of impairments be treated as conceptually different, as each may have different consequences for interpersonal relationships.

The association between ASC and lower positivity in SRQ is interesting given

findings that for families with two TD children, warmth and positivity in SRQ are associated with greater socio-emotional understanding (Howe et al., 2001). Siblings who spend more time together playing and interacting in a positive manner have also been found to develop more prosocial behaviours such as sharing, empathy and cooperation (Downey & Condrón, 2004). It has also been suggested that conflict resolution in sibling interactions is important for developing subsequent close friendships (Stocker & Dunn, 1990). In terms of potential consequences, variation in positive rather than negative sibling behaviour is linked with the psychological adjustment of an individual child (Pike, Coldwell, & Dunn, 2005). In his review Brody (1998) concludes that a balance between support and conflict in sibling relationships may promote psychosocial competence and this is compromised when conflict heavily outweighs supportive aspects. The implications for siblings of children with ASC (and lower levels of positivity in SRQ) may therefore be important to address, particularly if the ASC child in the dyad is older and more likely to be the driving force behind interactions that occur.

To our surprise, mothers reported significantly lower degrees of autistic traits in YS of children with ASC compared to TD children. This was contrary to expectations, since the siblings of ASC children often exhibit the broad autistic phenotype and display tendencies towards sub-threshold autism (Constantino et al., 2006), but should probably be interpreted with caution as parent ratings are subject to contrast effects (e.g., Saudino, McGuire, Reiss, Hetherington & Plomin, 1995). Mothers may be comparing their TD child with their ASC child, and hence by comparison the TD child appears relatively “normal” without many autistic traits. In addition, criteria for inclusion in this study did specify that the sibling of the ASC child must be TD with no diagnosis or suspected diagnosis of ASC. Thus in this

sample the broad autism phenotype found in family members in previous studies may have been less prominent. A recent study has suggested that mixed findings regarding whether an ASC child impacts negatively on a sibling could be explained by whether the TD child has other developmental difficulties below the threshold for clinical diagnosis (Benson & Karlof, 2008). Support or intervention for families with children displaying elements of the broad phenotype would need to be tailored differently to those who do not.

Limitations and future research

This study was limited in that it relied solely on mothers' reports. As mentioned, parental reports are subject to comparison effects whereby one child may seem extremely competent relative to their sibling who is not typically developing, but to an outsider might still be displaying some non-optimal behaviours or characteristics. This may be particularly important regarding autistic traits, as parents could be reluctant to admit to a TD child displaying traits comparable to the autistic child in the family. Future research could involve the points of view of the siblings themselves and ratings from professionals or teachers. Given that OS autistic traits seem to be associated with less positivity and increased negativity in SRQ cross-sectionally, it would be interesting to examine the influence of this in the longer term. Longitudinal data could assess potential causal links between autistic traits and SRQ at later ages.

For the present study there was some difficulty in obtaining a large sample from a clinical population, and families volunteered. Therefore a particular family type may have been 'self-selecting'. The study also relied on honesty regarding the ASC diagnosis of one child. Given that families were recruited through ASC support

groups and schools with specialised ASC classes it is thought unlikely that parents would have been exaggerating the extent of impairment. Additionally children with ASC all scored very highly on the AQ questionnaire, indicating that the sample were in fact on the high end of the autistic spectrum in terms of traits and behaviours. Future research should further consider the nature of the sibling relationship when a child with ASC is older compared to younger in a dyad, and it is possible that the extent to which one child's ASC-related impairments affects a TD sibling differs depending on whether autism diagnosis is accompanied by learning difficulties or other co-morbid impairments. Unfortunately the current sample size was not large enough to take this in to account, but it is certainly an area for further larger scale studies to address.

Conclusions

In summary, the results from this study provide a fresh look at how autistic traits of an older child relate to different aspects of the relationship between siblings. From the perspectives of mothers, more positivity in the relationship is associated with impairments in imagination, whilst more negativity is associated with impairments in social skills and mind reading.

Article 3**Brief Report: How Autistic Traits Relate to Current and Retrospective Sibling Relationship Quality Among Young Adults in the General Population**

Zoë Wheeler, Alison Pike & Nicola Yuill

Abstract

A growing body of literature is investigating the relevance of autistic traits in social relationships in the general population. We examined current and retrospective dyadic views of sibling relationship quality (SRQ) in relation to specific autistic traits of each member of the adult sibling dyad. Participants were 61 undergraduate students and their siblings (OS Mean age = 21.26, SD = 3.45 years; YS Mean age = 18.36, SD = 2.94 years) who completed questionnaires on their autistic traits and current and retrospective SRQ. Siblings showed good agreement with each other on all SRQ dimensions. Results indicated that some autistic traits such as impaired imagination were associated with retrospective accounts of positivity in SRQ, supporting previous research. Impaired mind reading and attention to detail were associated with warmth and conflict in current adult SRQ, and sibling difference in level of attention to detail predicted more rivalry in adult SRQ. Findings support the view that autistic traits may influence the quality of adult siblings relationships.

Theoretical background

Autism spectrum conditions (ASCs) are a class of pervasive developmental disorder characterised by a triad of impairments including social and communication difficulties, and repetitive and obsessive interests and behaviours (American Psychiatric Association, 1994). All ASCs represent variations in manifestation of this triad of impairments (Ronald et al., 2006). Recent research suggests that we should conceptualise autistic traits as dimensional rather than categorical, with distributions of traits (in terms of their behavioural manifestations) belonging to a continuum between the general population and those reaching diagnostic criteria for ASCs. There are only modest correlations between the three areas amongst both the general population and those with ASCs, indicating phenotypic independence (for example, social and non-social behaviours, although both associated with autism, are only modestly correlated) (Ronald, Happe & Plomin, 2005). Ronald et al. (2005) thus suggest it may be useful to consider these behavioural traits from the triad separately. Since research looking at families with and without children with ASC has linked positivity and negativity in sibling relationship quality (SRQ) during middle childhood to specific autistic traits (Wheeler, Pike & Yuill, submitted), the current study sought to investigate whether these results extend to relationships between young adult siblings in the general population. In line with these previous findings we expected higher scores on imagination impairments would be associated with retrospective accounts of warmth in SRQ, and impairments in social skills and mind reading ability to relate to retrospective accounts of negativity in SRQ. The current study also sought to explore how each of these may be uniquely related to young adult reports of current SRQ.

Sibling relationships are considered the most enduring of all social

relationships in a person's life, and can play a substantial role in shaping a person's cognitive development (Dunn, 1988). Stocker, Lanthier & Furman (1997) showed that adult SRQ was characterised not only by levels of warmth but also rivalry and conflict, similar to the usual conception of children's SRQ as comprising both positivity and negativity. Whilst most research on SRQ focuses on childhood, little has examined the perception of the relationship by young adults. Obtaining measures of relationship quality from both members of an adult sibling dyad is vital in gaining a fuller and potentially more reliable picture of these relationships. Factors influencing the sibling relationship can play a role in an individual's emotional well-being, with research showing high levels of conflict in adult sibling relationships are linked with poorer mental health (Stocker et al., 1997).

A number of previous studies have shown there are links between autistic traits and personal relationships. For example, higher levels of autistic traits in the general population have been linked to depressive and anxious symptomatology (Ghaziuddin, 2005), a relationship partially mediated by social-problem solving ability (Rosbrook & Whittingham, 2010). Additional research has indicated links between higher autistic traits in the general population and interpersonal deficits (Jobe & Williams White 2007), lower interpersonal skills such as nonverbal sensitivity (Ingersoll 2009), lower frequency and quality of friendships (Piven, Palmer, Jacobi, Childress, & Arndt, 1997), and (for men) lower relationship satisfaction with their partners (Pollman, Finkenauer & Begeer, 2009). Wheeler, Pike and Yuill (submitted) showed that during middle childhood, particular autistic traits of older siblings (OS) mediated the relationship between having an older child in a dyad with ASC and SRQ. Specifically, impairments in imagination ability mediated the link between family type and positivity in SRQ, whilst impairments in social skills mediated the

relationship between family type and negativity in SRQ.

How these same traits may link with sibling relationships in the general population and young adults in particular is an unexplored yet potentially important area. A number of studies have used a retrospective reporting of sibling relationships (e.g. Hardy, 2001; Stewart, Verbrugge & Beilfuss, 1998) and a good match has been demonstrated between retrospective reports and actual events (Block, 1971). Thus using retrospective reports may be a useful way to further examine links between childhood SRQ and autistic traits.

In the present study we had two main aims. Firstly we aimed to investigate links between traits relating to autism and retrospective dyadic accounts of SRQ by young adults. In line with Wheeler et al. (submitted) we expected that higher scores on imagination impairments would relate to higher positivity in retrospective accounts of SRQ, and higher impairments in social skills and mind reading ability to relate to higher retrospective accounts of negativity in SRQ. The current study also sought to explore how each autistic trait may be uniquely related to dyadic reports of current SRQ amongst these young adults. We examined whether higher self-reported autistic traits in terms of attention to detail, imagination, social skills and mind reading could predict lower dyadic warmth and higher conflict and rivalry in adult SRQ.

Method

Participants

One hundred and thirty nine undergraduate university students (17 males, 122 females) completed questionnaires. Nearly all students agreed to passing on a copy of the questionnaire to their sibling nearest in age and approximately 50% were returned by mail. Students were recruited through the first and second year psychology pool at

the University of Sussex and given course credits upon questionnaire completion. In total the sample consisted of 12 male-female, 2 male-male, 13 female-male and 34 female-female dyads. Mean age of OS was 21.26 years ($SD = 3.45$) and for YS 18.36 years ($SD = 2.94$).

Measures

Autistic Traits. Participants completed the Autism Quotient (AQ), which is a 50 item self-report questionnaire assessing autistic traits or tendencies (Baron-Cohen et al., 2001). The AQ has been shown to differentiate between those diagnosed as on the autism spectrum in clinical interviews, and typically developing controls, and shows good inter-rater and test-retest reliability (Baron-Cohen et al., 2001). In this sample reliability was good, with Cronbach's alpha ranging from .81 to .94. The AQ comprises four subscales; social skills, mind reading, imagination and attention to detail (Baron-Cohen et al., 2001). Response options are on a four point likert scale ranging from 0 (= definitely disagree) to 3 (= definitely agree), with higher scores indicating higher levels of autistic traits.

Adult Sibling Relationship Quality. The Adult Sibling Relationship Questionnaire (ASRQ; Lanthier & Stocker, 1992) was used to assess current sibling relationship quality. This questionnaire is made up of items measuring the quality of adult sibling relationships in terms of three dimensions; warmth, conflict, and rivalry. Participants respond to the items on the scale based on their relationship with the sibling closest in age. The warmth subscale includes items such as, "How close do you feel to this sibling?", the conflict subscale items such as "How much do you put this sibling down?", and the rivalry subscale items such as, "Do you think your mother is closer to you or this sibling?". Participants respond on a five-point scale with higher scores

indicating higher levels of warmth, conflict or rivalry. Alpha reliabilities were .95 for the warmth subscale, .91 for the conflict subscale and .81 for the rivalry subscale. OS and YS reports of warmth, conflict and rivalry in adult (current) SRQ were significantly positively correlated and were thus combined to obtain dyadic reports for these three subscales ($r(61) = .70, p < .01$, $r(61) = .50, p < .01$ $r(61) = .48$, for positivity, negativity and rivalry respectively).

Retrospective Sibling Relationship Quality (RSRQ). The final section of the questionnaire was retrospective. It consisted of a modified version of the 14-item questionnaire version of the Maternal Interview on Sibling Relationships (Stocker, Dunn, & Plomin, 1989). Participants were asked to think about a time when they and their sibling were *both* in primary school (i.e., aged 6 - 11 years). They were instructed that, if there was a larger age gap than this, they should note it in the appropriate space, and consider a time when they were about 8 years old. Instructions stated, “Please think back to this time (on average) and respond only about the sibling you answered the previous section about”. Participants rated how often they remembered displaying behaviours relating to the sibling relationship (for example, playing together, companionship, sharing, quarrelling or competing) on a likert scale ranging from 0 (*almost never*) to 5 (*regularly*). Items were averaged to obtain a mean positivity and mean negativity score for each member of the dyad. Cronbach's alpha indicated there was good reliability for both positivity (.89) and negativity (.84) scales. OS and YS reports of retrospective positivity and negativity in SRQ correlated significantly highly and were thus combined ($r(61) = .62, p < .01$, $r(61) = .58, p < .01$ respectively).

Procedure

Participants were given a questionnaire booklet to complete individually and an envelope to return the questionnaire in. Written instructions were presented at the start of each section of the questionnaire and participants were told there was no right or wrong answer. Once handed back, they were asked if they would voluntarily pass on an identical copy of the questionnaire to the sibling nearest in age (who they answered parts of the questionnaire with reference to). They were provided with a stamped envelope for posting the questionnaire to their sibling if required, and another reply paid envelope for their sibling to send back the completed questionnaire to the researcher.

Results

Preliminary analyses

There were significant differences in gender composition of dyads with more female-female dyads than male-male dyads ($\chi^2(3) = 35.59, p < .01$). In addition, there were significant differences in levels of warmth in adult SRQ, with female-female dyads reporting the highest level of warmth and male-male dyads the least ($F(3, 135) = 11.46, p < .01$).

Table 1: Mean (with SD) for retrospective (RSRQ) and current (dyadic) (ASRQ) sibling relationship quality and older and younger sibling self-reported autistic traits.

	Mean	SD
ASRQ Warmth	3.24	.611
ASRQ Conflict	2.13	.51
ASRQ Rivalry	.45	.36
RSRQ Positivity	2.92	.85
RSRQ Negativity	2.26	.88

OS AQ Total	52.36	12.82
YS AQ Total	52.74	10.73
OS IMR	17.69	5.71
YS IMR	17.95	5.83
OS ISS	14.20	7.50
YS ISS	13.48	5.69
OS II	5.48	3.00
YS II	5.25	2.92
OS AD	11.02	3.73
YS AD	12.22	3.83

Note. OS AQ= total score for OS on Autism Quotient, OS IMR= score for OS on impaired mind reading subscale, OS ISS= score for OS on impaired social skills subscale, OS II= score for OS on impaired imagination subscale, OS AD= score for OS on attention to detail subscale, YS AQ= total score for YS on Autism Quotient, YS IMR= score for YS on impaired mind reading subscale, YS ISS= score for YS on impaired social skills subscale, YS II= score for YS on impaired imagination subscale, YS AD= score for YS on attention to detail subscale.

Correlations

Firstly we examined correlations between dyadic RSRQ and ASRQ ratings, and OS and YS autistic traits (see Table 1). For retrospective ratings, less positivity in SRQ was significantly associated with higher levels of impaired imagination for both YS and OS. There was also a trend towards a significant association between higher retrospective ratings of negativity in SRQ and higher YS total AQ scores, and between higher negativity in SRQ and higher levels of YS attention to detail.

Table 2: Correlations between retrospective (RSRQ) and current (dyadic) (ASRQ) sibling relationship quality and older and younger sibling self-reported autistic traits.

	Retrospective (dyadic) SRQ (<i>N</i> = 61)		Current (dyadic) ASRQ (<i>N</i> = 61)		
	Positivity	Negativity	Warmth	Conflict	Rivalry
OS AQ	-.20	.16	-.15	.05	.04
YS AQ	-.11	.23 ^t	-.22 ^t	.21 ^t	.36**
OS IMR	-.18	.14	-.24 ^t	.18	-.03
YS IMR	-.04	.18	-.23 ^t	.27*	.12
OS ISS	-.08	.04	.00	-.10	.09
YS ISS	-.15	.02	-.19	-.01	.23 ^t
OS II	-.38**	.02	-.16	.05	-.03
YS II	-.29*	.18	-.17	.13	.17
OS AD	-.03	.19	-.06	.01	-.23 ^t
YS AD	.01	.21 ^t	.06	.03	.30*

Note. OS AQ= total score for OS on Autism Quotient, OS IMR= score for OS on impaired mind reading subscale, OS ISS= score for OS on impaired social skills subscale, OS II= score for OS on impaired imagination subscale, OS AD= score for OS on attention to detail subscale, YS AQ= total score for YS on Autism Quotient, YS IMR= score for YS on impaired mind reading subscale, YS ISS= score for YS on impaired social skills subscale, YS II= score for YS on impaired imagination

subscale, YS AD= score for YS on attention to detail subscale.

^t $p < .10$, * $p < .05$, ** $p < .01$

For current adult SRQ, links between lower dyadic warmth in ASRQ and greater YS mind reading impairments, and between lower dyadic warmth and greater OS mind reading impairments approached significance. The association between higher YS total AQ score and lower dyadic warmth also approached significance. Higher levels of YS mind reading impairments were significantly linked to higher dyadic ratings of conflict within ASRQ. Higher levels of dyadic rivalry were significantly linked to higher YS total AQ traits, higher YS levels of attention to detail and higher levels of OS impaired mind reading. Correlations approached significance between rivalry and YS impairments in social skills, and between rivalry and lower levels of OS attention to detail.

There was a significant difference between the correlation coefficients for YS attention to detail and rivalry and OS attention to detail and rivalry in ASRQ ($z = 2.93, p < .01$). For YS, higher scores were associated with more rivalry in SRQ (see Table 1), but the opposite pattern was seen for OS. This unexpected finding led us to examine the possibility that sibling similarity in attention to detail might facilitate lower levels of rivalry. To test this, a post-hoc difference score was calculated to determine whether dyads similar in terms of attention to detail level had less rivalry in SRQ. A larger attention to detail difference score did correlate significantly with higher levels of rivalry ($r(61) = .39, p < .01$). To further check this explanation, a post-hoc partial correlation, controlling for difference in attention to detail total scores, determined that the correlation between OS attention to detail and rivalry was no longer significant ($r(61) = .05, p = .71$). This indicates that controlling for the

difference in attention to detail scores did account for the unexpected positive correlation found between OS attention to detail and rivalry in ASRQ.

Predicting SRQ

Using hierarchical regression analyses we next examined whether YS and OS autistic traits could predict the various dyadic SRQ outcomes controlling for sex constellation of the dyad (using number of females), age, and age difference between siblings. Only significant regression equations are reported. In the first step, number of females in the dyad, age and age difference were entered in order to control for the sibling dyad characteristics. In the second step individual OS and YS autistic traits were entered. Number of females in the dyad and OS level of impaired imagination significantly predicted positivity in retrospective SRQ ($\beta = .25$, $t = 2.00$, $p < .05$ and $\beta = -.28$, $t = -2.16$, $p < .05$ respectively). The contribution made by YS impaired imagination approached significance in predicting positivity in retrospective SRQ ($\beta = -.22$, $t = -1.75$, $p < .10$). This indicates that higher levels of reported positivity in retrospective SRQ was predicted by having (more) females in the dyad and lower impairments in imagination ability of the siblings.

Regression equations predicting (current) ASRQ also involved entering sibling dyad characteristics as the first step, followed by OS and YS autistic traits. Controlling for these indicated that autistic traits did not offer any significant independent prediction of ASRQ warmth or conflict. Higher levels of ASRQ warmth was predicted only by higher numbers of females in the sibling pair ($\beta = .24$, $t = 1.99$, $p < .05$). For ASRQ rivalry, one autistic trait offered an independent prediction. A larger age gap between siblings ($\beta = .29$, $t = 2.09$, $p < .05$), and larger difference in attention to detail scores ($\beta = .32$, $t = 2.29$, $p < .05$) (i.e. less similarity between

siblings) significantly predicted increased levels of rivalry in current ASRQ.

Discussion

The results obtained partially supported our expectations, with findings that higher scores on imagination impairments related to lower positivity in dyadic retrospective accounts of SRQ. However impairments in social skills and mind reading ability did not relate to retrospective accounts of negativity. We also sought to explore how autistic traits related to dyadic reports of current SRQ amongst young adults (ASRQ). Although a number of associations were significant or approached significance, we found that when controlling for dyad composition and age of siblings, only attention to detail significantly predicted higher levels of rivalry in adult SRQ.

For each sibling, higher levels of impaired mind reading were linked with lower warmth in ASRQ, and higher impairments in mind reading for YS were linked with higher levels of conflict in ASRQ. Mind reading encompasses behaviour such as understanding another person's thoughts or feelings (e.g. "I find it easy to work out what someone is thinking or feeling just by looking at their face") and being able to put oneself in their shoes, and can be thought of as relating to theory of mind. These findings lend support to Wheeler et al. (submitted) who found that impairments in the ability to mind read is associated with increased negativity in SRQ during childhood. The results also support a proposition by Doody, Hastings, O'Neill, & Grey (2010) that warmth in the sibling relationship may be hampered by a lack of a developed theory of mind. Links between mind reading and warmth or positivity in adult SRQ may mean that different ASC related traits are more influential for the sibling relationship at different points across the lifespan.

The number of females in the dyad and OS level of impaired imagination significantly predicted retrospective positivity in SRQ, with the contribution made by YS impaired imagination approaching significance. This substantiates the view that imaginative ability is an important factor in play and positive interactions for children (Wheeler et al., submitted). Greater warmth in ASRQ was predicted by the number of females in the sibling pair but not by any specific autistic trait. This finding of higher warmth within female sibling dyads was not unexpected and has been demonstrated in previous studies (e.g. Buhrmester & Furman, 1990).

More rivalry in ASRQ was predicted by a greater age gap between siblings and a larger difference in attention to detail scores, possibly indicating that more similarity could facilitate lower levels of rivalry. In the AQ questionnaire, the attention to detail subscale theoretically taps into the non-social features of autism (Baron-Cohen et al., 2001). This result lends support to the suggestion that similarity in autistic traits may facilitate better quality sibling relationships, and supports Wheeler et al. (submitted) who found that similarity of siblings in terms of autistic traits and impairments in social skills were both associated with more positivity in SRQ in mother reports.

That difference in levels of attention to detail was most closely linked to negative elements of ASRQ is a finding worth investigating further, as this particular trait has also been associated with elevated YS adjustment difficulties amongst children with older siblings with ASC (Wheeler, Pike & Yuill, in preparation). Jobe & Williams White (2007) found that this element of the triad was related to college students' motivation to maintain romantic relationships and suggested it represented a resistance to change. Restricted and repetitive interests and behaviours are the most variable of ASC related traits and it has even been proposed that these non-social

behaviours have largely independent causes from social impairments (Mandy & Skuse, 2008). Kanner (1943) referred to the repetitive and obsessive behaviour patterns seen in individuals with autism as an “insistence on sameness”. One person’s insistence on sameness and routine and inability to view the world in a holistic manner may considerably influence the sibling relationship. Although this is the only non-social domain, it may be that rigidity and inflexibility associated with this element of the autistic triad leads to difficulty understanding a sibling and thus higher levels of rivalry and competition.

Limitations and future directions

The results of the present study are subject to limitations such as a relatively small sample size from one area of England and the majority of dyads consisting of females. We did however take the latter into consideration by controlling for dyad sex constellation when predicting SRQ outcomes. Respondents, particularly siblings of those who initially chose to take part were self-selecting and we can therefore not obtain self-report data from those who did not want to take part. Only the individual concerned reported on their autistic traits, and it is possible be that more reliable results could be gained by having more than one rater in future studies.

Past events and experiences had whilst growing up with a sibling are likely influence current relationships between them. It is also likely that when adults remember childhood events, present relationships and circumstances influence their recall, reconstructions and interpretations (Stewart, Verbrugge & Beilfuss, 1998) and the accuracy of such reports does not necessarily determine how influential these memories and retrospective perceptions are (Felson & Zielinski, 1989). A number of studies have used a retrospective reporting of sibling relationships (e.g. Hardy, 2001;

Stewart et al., 1998), however we are unaware of any previous studies taking into account views of both siblings and thus using dyadic reports.

Conclusions

The current study adds to the burgeoning literature indicating that autistic traits play a role in personal relationships, and extends this to the realm of young adult siblings in the general population. In particular these findings substantiate the idea that specific autistic traits relate differently to aspects of human relationships and reinforce the dimensional viewpoint of autism by further illustrating that variations in these traits is present in the general population. The results are reinforced by the use of dyadic ratings of both current and retrospective SRQ for young adults. The relationship between OS and YS attention to detail and rivalry in adult sibling relationships was unexpected. However the results indicate that this is one autistic trait in particular that should be considered in investigating interpersonal relationships. More research recognising the influence of this characteristic for the general population and those with ASC is certainly warranted, given intervention studies (e.g. Golan & Baron-Cohen, 2006, Williams White, Koenig & Scahill, 2007) aimed at improving personal relationships often focus on social skills and mind reading deficits.

Article 4:

Links between adjustment, autistic characteristics and sibling relationship quality for
ASC siblings

Zoë Wheeler, Alison Pike & Nicola Yuill

Abstract

We examined adjustment in relation to sibling relationship quality (SRQ) and older sibling (OS) autistic characteristics amongst younger siblings (YS) from typically developing (TD) dyads and those where the older sibling (OS) had an autism spectrum condition (ASC). Positivity and negativity in SRQ and autistic characteristics were tested as both moderators and mediators of the association between family type and YS adjustment difficulties. Eighty-four families participated, including 34 sibling pairs where the OS had ASC. Mothers completed questionnaires regarding adjustment, SRQ and autistic traits for both children. Families with OS ASC reported significantly lower levels of positivity and higher levels of negativity in SRQ. YS from these families also scored significantly higher on two adjustment difficulty subscales; emotional symptoms and peer problems. Less positivity and more negativity in SRQ were associated with poorer YS adjustment. Only OS attention to detail moderated and mediated links between family type and YS being at greater risk of exhibiting emotional symptoms. It was concluded that whilst SRQ seems to be linked to adjustment in TD dyads, there are other factors not accounted for by this study that influence the adjustment outcomes for YS of ASC children. The potential implications for TD children with ASC siblings are discussed.

Theoretical background

Research into siblings of children with disabilities has been referred to as an underdeveloped field (Hodapp, Glidden & Kaiser, 2005). Only a limited number of studies have looked specifically at typically developing (TD) siblings of individuals with autism spectrum conditions (ASC) and the resulting developmental outcomes in terms of these children's psychological adjustment. A recent review of twelve studies examining ASC sibling adjustment revealed mixed results over the last ten years (Meadan, Stoner & Angell, 2010). Some studies reported no significant negative impact on the TD child in the dyad whilst others reported various psychological adjustment difficulties. In order to elucidate such mixed findings Hodapp et al. (2005) recommended research with ASC siblings focus on TD children and explore potential mediators and moderators that could affect adjustment. The present study sought to examine whether adjustment of ASC siblings is linked with sibling relationship quality (SRQ) in a similar manner to literature on TD sibling pairs, and whether there is also a role for specific autistic traits of the ASC child within the dyad in affecting their TD sibling's adjustment.

ASC may affect up to 57 children per 10,000 (Scott, Baron-Cohen, Bolton, & Brayne, 2009) and is a class of developmental disorders subsuming pervasive developmental disorder (PDD), autism and Aspergers syndrome. ASC involves a triad of impairments including deficits in social interactions, impairments in communication and repetitive and stereotyped interests (American Psychiatric Association, 1994). These can be conceptualised in a quantitative manner as involving impaired imagination, impaired social skills, impaired mind reading skills, and attention to detail (Auyeung, Baron-Cohen, Wheelright, & Allison, 2007). The first three mentioned traits represent the social and communication domains, whilst the last

(attention to detail) relates to the third area of the triad. Each case of ASC is now thought to represent variations in manifestations of this triad of impairments (Ronald et al., 2006). Autism is considered largely genetic in aetiology and hence siblings of children are at increased risk of being diagnosed with an ASC themselves (2%-6%; Newschaffer, Fallin & Lee, 2002) or exhibiting similar symptoms that do not place them at a level for clinical diagnosis (known as the broader phenotype) (12%-20%; Bolton et al., 1994). Heritability studies indicate that distributions of autistic traits (in terms of their behavioural manifestations) are dimensional and thus belong to a continuum between the general population and those reaching diagnostic criteria for ASC (Baron-Cohen, Wheelwright, Skinner, Martin, & Clubley, 2001). Each component of the triad appears in large-scale studies to have phenotypic independence with only modest correlations between them in both the general and ASC populations (Ronald, Happe & Plomin, 2005). For example, social and non-social behaviours are only modestly correlated although both are associated with autism. Ronald et al. (2005) thus suggested that each behavioural trait component of the triad be considered separately.

Despite there being elevated rates of autistic like tendencies amongst ASC siblings, the majority are typically developing (TD) children growing up with a sibling who is not typically developing. A number of studies have demonstrated that parents report siblings of children with ASC are at increased risk of adjustment problems, especially in terms of internalising problems (Petalas, Hastings, Nash, Lloyd, & Dowey, 2009; Rao & Beidel, 2009; Ross & Cuskelly, 2006). Ross & Cuskelly (2006) found that mothers of ASC children reported 40% of the siblings had adjustment problems, and in particular were at increased risk of internalising behaviour. TD sibling adjustment difficulties also appear to persist over time and it

seems to be the autism rather than accompanying intellectual disability of the ASC child which has a potentially negative effect (Petalas et al., 2009). Similar results were obtained by Verte, Roeyers, & Buysse (2003), ASC siblings aged between 6 and 11 years of age had significantly more internalising and externalising behaviour problems than children of age matched controls from TD dyads. In addition to the extant literature focusing on parent perceptions, Gold (1993) found that adolescent siblings of boys with autism had higher levels of self-reported depression.

Benson & Karlof (2008) found that ASC siblings with a diagnosis of a developmental disability themselves scored significantly higher in terms of adjustment problems (and lower on the prosocial scale) but those siblings without ASC or any other diagnosis did not differ significantly on overall adjustment difficulties from normative data. However closer examination of their results indicates that even non-diagnosed ASC siblings scored significantly higher in terms of emotional symptoms than normative data. Fisman et al. (1996) investigated siblings of children with PDD who did not have any significant developmental difficulties themselves and found higher rates of externalising and internalising problems than children with TD siblings and siblings of children with Downs syndrome. They suggested there was a transactional mechanism at work rather than any single risk or protective factors involved in the development of adjustment difficulties. A 3-year follow-up study (Fisman, Wolf, Elliston, & Freeman, 2000) similarly found more adjustment problems amongst the ASC siblings than those from TD or Downs syndrome (DS) families. Externalising in particular was strongly persistent and overall sibling adjustment problems were worse amongst these children when parental distress was also high.

Intriguingly, some research has found the opposite pattern of results,

indicating that ASC siblings may have a more positive view of themselves and be even better adjusted than those with TD siblings (Ferrari, 1984; Kaminsky & Dewey, 2002; Mates, 1990; Pilowsky, Yirmiya, Doppelt, Gross-Tsur, & Shalev, 2004). Kaminsky & Dewey (2002) compared three groups of children, those with TD siblings, those with siblings with Downs syndrome and those who had autistic siblings on child-reported perceived social support and parent-reported adjustment. They found that ASC siblings were not only relatively well adjusted but also reported feeling well supported. These children were aged between 8 and 18 and the majority of parents themselves attended support group meetings. Lower levels of adjustment problems were found for children from larger families. One possible reason for these findings is problematic adjustment behaviours seem to be more common amongst siblings during middle childhood, for example aged between 6 and 11 years (Verte et al., 2003) rather than amongst siblings during adolescence.

Other possible explanations for these inconsistent past findings are limited sample sizes, different questionnaire measures, severity of autism of the affected child, different comparison groups and whether the typical child in the dyad is older or younger than the child with ASC. Given the mixed findings of several previous studies Hodapp et al. (2005) suggested that identifying potential mediators and moderators in sibling research should be a prime focus.

Little research has specifically examined ASC siblings who are the younger child in the dyad. Indeed, most samples have consisted of more TD siblings who are older than younger (eg., Benson & Karlof, 2008; Fisman, et al., 1996; Kaminsky & Dewey, 2002). In their suggestions for a research agenda on siblings of children with disabilities Hodapp et al. (2005) recommend that studies systematically sample either younger or older siblings. A number of studies have identified that being the younger

sibling is an additional risk factor in adjustment difficulties in ASC families (e.g., Gold, 1993; Hastings, 2003a; Petalas et al., 2009). For this reason the present study included only younger siblings (YS) of ASC children.

There are a number of difficulties that come alongside ASC, for example, the sibling relationship in such families will likely be influenced by the fact that there tends to be less interaction between the two children in a family when one has ASC (Knott, Lewis & Williams, 1995). Research has indicated that, in families with two TD children, negative sibling interaction patterns (for example hostile interactions) correlate with more conduct problems (Bank, Burraston, & Snyder, 2004; Bank, Patterson, & Reid, 1996). As adjustment problems are more frequent in families where the sibling relationship is of poorer quality, this may be an important factor to consider in clarifying why some ASC siblings are at greater risk of adjustment problems. It is possible that in these families less negativity and more positivity in SRQ buffers the effect of an ASC sibling on adjustment problems. In the present study, mother reports of the SRQ was considered as a possible mediating and/or moderating factor on the link between adjustment and having a sibling with ASC.

Benson & Karlof (2008) suggest that having a sibling with ASC may only be detrimental to a TD child if they themselves have any kind of developmental difficulty, even those below the threshold for clinical diagnosis. The recruitment criteria for the present study specified that the sibling should be TD with no history, diagnosis or suspected diagnosis of a developmental disorder.

Whilst some studies have included severity of autism or ASC related behaviour problems as a moderating factor in ASC sibling adjustment (e.g., Hastings, 2007, Hastings 2003b), none that we are aware of have focused on more specific traits that might contribute to YS adjustment amongst ASC families. Hastings (2003b) for

example, noted that less severe autism in combination with formal social support was related to lower levels of adjustment problems for the TD sibling. In addition, behavioural problems of an affected child (more of which would be associated with more severe autism) have been shown to predict TD sibling adjustment in a 2-year longitudinal study by Hastings (2007). As mentioned, recent findings have indicated that children with ASC differ in terms of the severity of each of the aspects that make up the autistic triad of impairments. Since two of these impairments relate to social functioning (social interaction and communication related impairments) and these are core aspects of meaningful human relationships, elevated scores for these particular impairments may be key to determining adjustment difficulties.

In the present study we focused on the mechanisms by which ASC siblings may be at risk of adjustment difficulties. We examined mother perceived positivity and negativity in SRQ in moderating or mediating YS adjustment. We also explored whether particular autistic traits of the OS with ASC (impaired imagination, impaired mind reading, impaired social skills and attention to detail) could be linked to YS adjustment. We hypothesised that direct links would be mediated and moderated by SRQ and specific OS autistic traits. For example, it is conceivable that YS adjustment is negatively affected by factors like high levels of conflict with siblings rather than the presence of a sibling with ASC. Likewise, it is possible that growing up with an ASC sibling only affects adjustment if negativity in SRQ is also particularly high. Therefore, in order to obtain a detailed picture of correlates of YS adjustment in ASC families, mediation and moderation processes were examined.

Method

Sample and Recruitment Criteria

For the target group, the older sibling (OS) had a prior medical diagnosis of an

ASC and the younger (YS) had no history (diagnosis or suspected diagnosis) of ASC or related disorder. Children from control families had no history of ASC or related disorder. Mothers completed questionnaires with reference to the two siblings closest in age within the bracket of 4 and 13 years (maximum 5 years age-gap).

Target Families: Those with an ASC child and a TD sibling

Families with an ASC child were approached in a number of different ways, since as described by Rivers & Stoneman (2008), it was necessary to conduct non-random purposive sampling because there is a relatively low incidence in the general population of target families. Local schools in South East England with ASC units or integration policies were contacted by email, letter or phone and asked if they would pass on information letters to potential families and an advertisement was placed on the National Autistic Society website. Parent ASC support groups were contacted and asked to disseminate information letters regarding the study (30% of target families were contacted this way), and leaflets advertising the study were sent to families of newly diagnosed children with ASC registered at a local NHS primary care unit. Families received an information letter regarding the study, with contact details. Ten percent of families receiving information letters responded and were sent questionnaires. These were returned to the researcher in a reply paid envelope. Snowballing (see control family recruitment) was also used as a method of contacting the ASC families. Thirty-three were two parent households and 1 was a single parent household.

Control condition families: those with two TD children

Two-thirds of the control group were contacted via their previous participation in the Sisters and Brothers Study (SiBS) (Pike, Coldwell, & Dunn, 2006). This originally involved recruitment through schools also in the south east of England.

Forty-four were two parent households and 6 were single parent households. Other control condition families with comparably aged siblings were recruited by emails, word of mouth and snowballing (each family was asked to recommend another family with similarly aged children who might be willing to partake in the study and could be contacted by the researcher), and advertisements. As above, families who opted in to the study by contacting the researcher were sent a questionnaire booklet and reply paid envelope.

In total eighty-four families participated in the study. The ASC group consisted of 34 families. Five children also had co-morbid dyspraxia or learning difficulties. The remaining 29 reported having an OS with a diagnosis of autism (4), high functioning autism (17) or Asperger's Syndrome (8). Dyads consisted of 18 boy-girl pairs, 9 boy-boy pairs, 3 girl-boy pairs and 4 girl-girl pairs. Fifty families made up the control group. Dyads consisted of 9 boy-girl pairs, 18 boy-boy pairs, 14 girl-boy pairs and 9 girl-girl pairs. There was no significant difference in annual income level between the control and ASC families.

Measures

Autistic Traits. Mothers and fathers completed the Autism Quotient (AQ), which is a 50 item self-report questionnaire assessing autistic traits or tendencies (Baron-Cohen et al., 2001). Mothers also completed the child version of the AQ questionnaire for both the younger and older sibling (AQ-Child- Auyeung, et al., 2007). The AQ has been shown to differentiate between those diagnosed as on the autism spectrum in clinical interviews, and normal controls, and shows good inter-rater and test-retest reliability (Baron-Cohen et al., 2001). In this sample reliability was good, with Cronbach's alpha ranging from .87 to .94.

The AQ comprises four subscales; social skills, mind reading, imagination and attention to detail (Baron-Cohen et al., 2001). Response options are on a four point likert scale ranging from 0 (= definitely disagree) to 3 (= definitely agree), with higher scores indicating higher levels of autistic traits.

Sibling Relationship Quality. To measure sibling relationship quality, a modified 14-item questionnaire version of the Maternal Interview on Sibling Relationships (Stocker, Dunn, & Plomin, 1989) was used. Mothers rated how often their children display behaviours relating to the sibling relationship (for example, playing together, companionship, sharing, quarrelling or competing) on a likert scale ranging from 0 (*almost never*) to 5 (*regularly*). Scores were averaged to obtain a mean positivity and mean negativity score for each dyad. Cronbach's alpha indicated there was good reliability for both positivity (.89) and negativity (.73) scales.

Sibling Adjustment. The Strengths and Difficulties Questionnaire (SDQ; Goodman, Ford, Simmons, Gatward, & Meltzer, 2000) is a concise parent reported behavioural screening questionnaire for 4 to 16 year olds used to identify or indicate possible behavioural or emotional problems. The SDQ consists of 25 items relating to five subscales. These include emotional symptoms (5 items), conduct problems (5 items), hyperactivity/inattention (5 items) and peer relationship problems (5 items). These four scales are added together to generate a total difficulties score based on 20 items. In addition, there is a fifth subscale measuring pro-social behaviour, which also has 5 items. Again, there was good reliability for this measure, with Cronbach's alpha for the subscales ranging from .75 to .88.

Results

Family type differences in SRQ and SDQ

The two family types were compared in a series of t-tests on demographic characteristics such as age, AQ, SDQ total difficulties and five subscales (hyperactivity, emotional symptoms, conduct problems, peer problems, prosocial scale), and negativity and positivity in SRQ (see Table 1). Chi-squared analyses determined that there was not a significant difference in family size (two or more than two children) by family type. There was a significant difference in sibling sex constellation of dyads between the two family types, which was expected as ASC is much more prevalent in males than females. Female YS scored significantly higher on the prosocial subscale of the SDQ than male YS ($t(82) = -3.08, p < .01$) but there were no other gender-related differences in other adjustment measures. ANOVAs determined that there were no significant effects of sibling sex constellation on YS adjustment or negativity or positivity in SRQ, and there was no significant correlation of age or age difference with these variables.

As we have reported previously (Wheeler, Pike & Yuill, submitted), mothers from ASC families reported significantly less positivity and significantly more negativity in SRQ and significantly higher OS AQ scores than mothers with two TD children. As can be seen in Table 1 mothers also reported that YS from ASC families scored significantly higher than those from TD families on two of the SDQ subscales, emotional symptoms and peer problems. There were no significant differences in the remaining subscales.

Table 1: Mean (with SD) for all study measures by family type. Higher AQ scores indicate higher degrees of impairment

	Family Type		<i>t</i> -value
	OS ASC Dyads	TD Dyads	
	N= 34	N= 50	
Mother Age (years)	41.88 (5.63)	41.60 (4.84)	.24
Father Age (years)	44.05 (5.87)	43.56 (5.23)	.33
YS Age (years)	7.35 (2.14)	8.24 (2.74)	-1.59
OS Age (years)	10.12 (2.30)	10.42 (2.53)	-.56
Mother AQ	41.76 (17.19)	45.86 (13.25)	-1.23
Father AQ	50.97 (29.14)	47.66 (25.45)	.55
YS AQ	34.65 (14.90)	45.88 (14.87)	-3.39**
OS AQ	100.26 (18.08)	45.70 (17.12)	14.01**
SRQ-Positivity	2.46 (.77)	3.09 (.79)	-3.64**
SRQ Negativity	2.62 (1.06)	2.17 (1.01)	2.00*
YS Hyperactivity	3.29 (2.66)	3.46 (2.40)	-0.29
YS Emotional Symptoms	3.56 (2.63)	2.34 (2.28)	2.26*

YS Conduct Problems	2.00 (1.86)	2.06 (1.83)	-0.15
YS Peer Problems	1.50 (1.48)	0.88 (1.15)	2.15*
YS Prosocial	8.53 (1.85)	7.94 (1.83)	1.44
YS Total Difficulties	10.06 (6.24)	8.74 (4.96)	1.08

* $p < .05$, ** $p < .01$

Mediation

In order to assess whether SRQ and/or OS AQ traits mediated the link between YS adjustment and having an OS ASC we ran a series of preliminary correlations. As illustrated in Table 2 there were a number of significant associations across the whole sample between negativity in SRQ and increased risk of YS adjustment difficulties. This was found for total difficulties as well as the four problem subscales (hyperactivity, emotional symptoms, conduct problems and peer problems). Positivity in SRQ was not significantly associated with any YS adjustment scale.

Table 2: Correlations between adjustment scales, AQ subscales and positivity and negativity in SRQ

	Total Sample (N= 84)					
	SRQ Positivity	SRQ Negativity	OS AD	OS IMR	OS ISS	OS II
Hyperactivity	-.12	.24*	.12	.05	-.04	.01
Emotional Symptoms	-.11	.24*	.28**	.23*	.20 ^t	.27*
Conduct Problems	-.15	.33**	-.01	.00	-.03	.00
Peer Problems	-.04	.24*	.23*	.20 ^t	.15	.23*
Prosocial Scale	.13	-.08	.11	.07	.13	.14
Total Difficulties	-.14	.36**	.20 ^t	.14	.05	.14

OS AQ = total score for OS on Autism Quotient, OS IMR = score for OS on impaired mind reading AQ subscale, OS ISS = score for OS on impaired social skills AQ subscale, OS II = score for OS on impaired imagination AQ subscale, OS AD = score for OS on attention to detail AQ subscale. ^t p < .10, * p < .05, ** p < .01

Across the sample OS AQ total score was significantly correlated with YS emotional symptoms ($r(82) = .27, p < .05$), and YS peer problems ($r(82) = .22, p < .05$). As can be seen in Table 2, increased YS emotional symptoms were also significantly correlated with higher OS attention to detail, impaired mind reading, impaired imagination and marginally associated with higher impaired social skills. Elevated YS peer problems were associated with higher OS attention to detail and impaired imagination scores and marginally associated with greater impaired mind reading scores. Higher OS attention to detail was also marginally associated with an increased likelihood of YS total difficulties.

After establishing that there was a relationship between family type and SDQ scores, we examined whether this was mediated by negativity and positivity in SRQ using a series of multiple regressions carried out in the manner outlined by Baron & Kenny (1986). According to Baron & Kenny (1986), mediation is indicated by a decrease in the predictive value of the independent variable (family type) on the dependent variable (SDQ subscale) when one of the proposed mediator variables (negativity in SRQ) is included in the regression equation.

Since significant group differences were found for YS emotional symptoms and peer problems, we focused on these outcome variables. Higher scores on these two subscales were significantly associated with higher levels of negativity in SRQ. The standardised beta weights are shown in Table 3 for negativity in SRQ and the two SDQ subscales. Family type significantly predicted YS emotional symptoms ($\beta = .24, t = 2.40, p < .05$). Once SRQ negativity was added into the regression equation family type approached significance as a predictor ($\beta = .20, t = 1.80, p < .10$), as did SRQ negativity ($\beta = .20, t = 1.79, p < .10$). A Sobel test assesses mediation by testing the null hypothesis that the mediated effect is zero (Sobel, 1982). This more stringent test

of mediation indicated that negativity in SRQ did not significantly mediate either relationship between YS emotional symptoms or peer problems and having an OS with ASC.

Table 3: Standardised beta weights for multiple regression analyses testing for mediation and younger sibling adjustment difficulties

Regression Model	IV (β)	Mediator (β)	r^2
SRQ-negativity and YS emotional symptoms			
IV = MED	.22**		.05
IV = DV	.24**		.05
IV + MED = DV	.20*	.20*	.07
SRQ-negativity and YS peer problems			
IV = MED	.22**		.04
IV = DV	.23**		.05
IV + MED = DV	.19*	.20*	.09
OS Attention to detail and YS emotional symptoms			
IV = MED	.52**		.26
IV = DV	.24**		.05
IV + MED = DV	.13	.22*	.07
OS Impaired imagination and YS emotional symptoms			
IV = MED	.70**		.49
IV = DV	.24**		.05
IV + MED = DV	.10	.20*	.06

Note. IV = independent variable (OS with ASC in the family vs two TD children);

MED = mediator (SRQ negativity/OS AQ subscale); DV = dependent variable (SDQ

Subscale for YS). * $p < .10$, ** $p < .05$

We also examined whether specific autistic traits of the OS mediated the relationship between YS emotional symptoms and peer problems and having an OS with ASC. OS attention to detail scores, impaired mind reading and impaired imagination were significantly correlated with emotional symptoms and peer problems, so the former three were tested as mediating variables. In these preliminary tests none of the OS AQ subscales mediated the links between having an OS with ASC and YS peer problems, however OS attention to detail and impaired imagination did seem to potentially mediate the effect of family type on YS emotional symptoms (see Table 3). For example, family type significantly predicted YS emotional symptoms ($\beta = .24$, $t = 3.29$, $p < .05$), but once OS AD was added into the regression equation family type was no longer significant ($\beta = .13$, $t = .52$, $p > .05$) whilst OS AD approached significance as a predictor ($\beta = .22$, $t = 2.06$, $p < .10$). The more stringent Sobel test confirmed that only OS attention to detail significantly mediated the relationship between an ASC child in a dyad and YS emotional symptoms ($z = 2.28$, $p = .02$).

Moderation Analysis

Our final analysis looked at whether SRQ or OS autistic traits moderated the relationship between having an older sibling with ASC and YS adjustment. This was in order to test whether the effects of SRQ or OS autistic traits on YS adjustment differed for families with OS ASC versus those with two TD children. A moderator is a variable that alters the strength of a causal relationship (Baron & Kenny, 1986), and is tested by computing an interaction term (multiplying the proposed moderating

variable by the predictor variable). We proposed that more negativity and less positivity in SRQ and higher degrees of OS autistic characteristics could each (independently) act as moderators in determining poorer YS adjustment outcomes. Thus we tested the significance of interaction variables family type x autistic trait and family type x SRQ in the final step of the regression analyses. All interaction terms were created using centred data. In the case of YS emotional symptoms, the family type x attention to detail interaction was significant indicating that attention to detail significantly moderated the relationship between family type and YS emotional symptoms ($\beta = .36$, $t = 2.29$, $p < .05$, see Table 4). Examination of zero-order correlation coefficients led to the conclusion that amongst OS ASC families a higher score for OS on the attention to detail subscale of the AQ predicted greater YS emotional symptoms.

Table 4: Multiple regression analysis testing older sibling attention to detail (OSAD) as a moderator of family type and younger sibling emotional symptoms.

YS Emotional Symptoms	B	SE B	β	ΔR^2
Step One				
Family type	-.21	.26	-.11	
OSAD	.20	.13	.20	.03
Step two (Interaction)				
Family type	-.34	.26	-.17	
OSAD	-.03	.16	-.03	
Family*OSAD	.59	.26	.36*	.06*

Total R^2 .09*

Note. Independent variable = OS with ASC in the family vs two TD children;

Moderator = AQ subscale OS attention to detail (OSAD); dependent variable = SDQ emotional symptoms subscale for YS. * $p < .05$

Discussion

We extended previous research by investigating whether SRQ and specific ASC related traits of OS could be the mechanism or buffering factor behind the increased level of YS adjustment difficulties amongst ASC families. Mothers reported significantly higher levels of emotional symptoms and peer problems amongst YS from ASC families than TD families. This supports a growing body of recent research (e.g., Lefkowitz, Crawford & Dewey, 2007; Petalas, Hastings, Nash, Lloyd, & Dowey, 2009; Rao & Beidel, 2009; Ross & Cuskelly, 2006) indicating that siblings of children with ASC are at increased risk of adjustment problems, particularly internalising problems.

Negativity in SRQ was significantly correlated with more YS adjustment difficulties, a finding in line with research solely on TD sibling pairs (Pike, Coldwell & Dunn, 2005). Contrary to our hypotheses however, SRQ did not mediate the link between having an ASC sibling and adjustment difficulties. These findings support Fisman et al. (2000) who also concluded that SRQ was not a mediating factor in determining adjustment of ASC siblings. This support is strengthened by our use of a more precise sibling group- only YS rather than a sibling group where the majority were OS, and focusing on middle childhood rather than a sample where the age range of children was between 7 and 21 years.

Also against expectations, SRQ did not moderate the link between family type

and YS adjustment difficulties. These results are somewhat consistent with Fisman et al. (1996) who found low negativity and high positivity in SRQ to be a buffering factor against externalising adjustment problems amongst siblings of TD and Downs syndrome individuals but not for those with ASC. It seems that for ASC families SRQ does not explain YS adjustment, although individually the two factors are likely to both affect TD siblings in ASC families.

A number of recent studies examining ASC sibling adjustment have indicated that severity of autism and related behaviours may play a part in the TD sibling's adjustment (Pilowsky et al., 2004; Hastings, 2007). It was for this reason that we examined specific autistic traits relating to the triad of impairments. Our finding that the attention to detail component related to the emotional adjustment of the TD child was somewhat surprising. Attention to detail mediated the relationship between YS emotional symptoms and having an OS with ASC. This indicates that it is not just having a sibling with ASC that can result in YS adjustment difficulties but rather when these specific OS traits (e.g. rigid routines and behaviour patterns) are particularly prominent then the YS is at risk of more internalising problems. Attention to detail also moderated the relationship between YS emotional symptoms and having an OS with ASC. Thus it seems that if in ASC families the OS has a higher tendency to focus on details then the YS may be particularly vulnerable to emotional (internalising) disorders.

The attention to detail subscale of the AQ theoretically taps into the non-social features of autism (Baron-Cohen et al., 2001), and that this was the autistic characteristic most closely link to elevated YS adjustment difficulties warrants further investigation. Restricted and repetitive interests and behaviours are the most variable of ASC related traits and it has even been suggested that these non-social behaviours

have largely independent causes from social impairments (Mandy & Skuse, 2008). It is interesting to consider how this specific part of a child with ASC's behavioural profile may impact on their TD sibling. Kanner (1943) referred to the repetitive and obsessive behaviour patterns seen in individuals with autism as an, "*anxiously obsessive desire for the maintenance of sameness*" (p. 245). This aspect of the autistic triad also includes restricted interests, as well as (often excellent) factual knowledge and rote memory, and has been theorised to relate to an information processing style called weak central coherence (Frith, 1989; Happe, 1999). One child in the family's insistence on sameness and routine and inability to view the world in a holistic manner may considerably disrupt family functioning and disturb everyday life. This in turn may affect and upset the TD sibling, leaving them more vulnerable to internalising difficulties. In terms of clinical implications, helping the TD child to understand the reasons behind their sibling's rigidity and implement cognitive or behavioural strategies to cope with this may be a practical and effective intervention.

Limitations and Future Research Directions

This study was limited in relying solely on mothers' reports. Future research could involve the points of view of the siblings themselves, and multiple ratings from professionals or teachers or even videotaped sibling interactions. It is worth noting that Lefkowitz et al. (2007) found good agreement between parent and sibling reports of adjustment and the present study concurs with their finding that ASC siblings are at increased risk of emotional problems and problems in social competence. Buffering factors not investigated here could also be important in determining ASC sibling adjustment. Taking account of other variables such as parent-child relationship may be warranted in future studies.

Due to the cross-sectional nature of the data, causal directions cannot be concluded. Given that children with ASC siblings were reported as having some increased adjustment difficulties, lower positivity and higher negativity in SRQ, it would seem important to examine the influence of this in the longer term. Longitudinal data could assess potential causal links between SRQ and specific traits and later adjustment.

For the present study there was some difficulty in obtaining a large sample from a clinical population, and families volunteered. Therefore a particular family type may have been self-selecting. The study also relied on honesty regarding the ASC diagnosis of one child. Given that families were recruited through ASC support groups and schools with specialised ASC classes it is thought unlikely that parents would have been exaggerating the extent of impairment. Additionally children with ASC all scored very highly on the AQ questionnaire, indicating that the sample were in fact on the high end of the autistic spectrum in terms of traits and behaviours. Future research should further consider the nature of the sibling relationship when a child with ASC is older compared to younger in a dyad and the potential importance of similarities in autistic traits between siblings. The extent to which one child's ASC-related impairments affects a TD sibling may differ depending on whether the autism diagnosis is accompanied by learning difficulties or other co-morbid impairments. Unfortunately the current sample size was not large enough to take this in to account, but it is certainly an area for further larger scale studies to address.

Conclusions

In the present study it seems that for children with ASC siblings there is an increased likelihood of peer problems and emotional symptoms compared to those

with TD siblings. Higher levels of the autistic trait attention to detail amongst OS mediated the relationship between family type and YS emotional symptoms, indicating that YS are more susceptible to internalising difficulties when OS score higher on this trait- it is not simply due to growing up with a sibling who has ASC. This particular trait was also a moderating factor in that internalising adjustment difficulties were highest for YS in ASC families when the OS scored higher on attention to detail.

9. General Discussion

Previous studies examining the impact on children of having siblings with ASC have produced somewhat mixed findings (Meadan et al., 2010). This thesis utilised a relationships approach to child development and addressed parts of a call by Hodapp et al. (2005) to focus on identifying potential mediators and moderators of the relationship between growing up with an ASC sibling and adverse outcomes. Gaps in the current literature were addressed by focusing on specific ASC related traits (attention to detail, impaired mind reading ability, impaired social skills and impaired imagination) of both siblings in the dyad, rather than simply considering autism as a categorical variable.

The theoretical standpoint taken for the present work was a family systems and relationships approach to child development. These approaches emphasise the crucial role of relationships in shaping an individual (Reis, Collins & Berscheid, 2000). Relational interactions will both shape and depend on the characteristics of the individuals involved (Reis et al., 2000). Each relationship forms part of a network of other relationships, with interactions embedded within, and affected by, past experiences as well as expectations regarding the future (Hinde, 1989). Hence it can be expected that all family members will be affected by the unique nature of one individual's ASC-related impairments (Hastings et al., 2005), and the sibling relationship itself is likely to be different when one child has ASC compared to those where both children are typically developing. This was supported by the findings that ASC siblings seem to experience lower levels of positivity and higher levels of negativity in their relationships with an OS than children with a TD OS, and were at greater risk of adjustment difficulties.

Mothers from ASC families reported poorer SRQ amongst their children than mothers with two TD children, and the siblings of children with ASC reported on their relationship experiences and desired more harmony and less conflict in their relationships. SRQ did not appear to be a potential causal factor for determining YS adjustment difficulties in ASC families, unlike the links usually seen for families with two TD children. Different elements of the social and communication domains in the autistic triad related to negativity compared to positivity in SRQ, and there was a significant relationship between attention to detail (i.e. the non-social domain) and YS adjustment but the social and communication domains did not function as moderating or mediating variables of YS adjustment. Additionally, there were significant associations between higher degrees of autistic traits and poorer quality of current adult sibling relationships and retrospective accounts of SRQ. Overall these findings indicate that links between autistic traits and the quality of sibling relationships and adjustment can be elucidated by considering the influence of each trait separately.

9.1. Sibling relationship quality in families with an older ASC sibling

Mothers of children with ASC reported significantly less positivity and significantly more negativity in SRQ than mothers with two TD children. These findings are in contrast to some studies indicating SRQ does not differ markedly between families with a child with ASC and those with TD pairs (e.g. McHale, Sloan & Simeonsson, 1986). Roeyers & Mycke (1995), however, found in a sample with both older and younger siblings of children with ASC that those who were younger than their disabled siblings had the most negative sibling relationships. Thus the present study, which compared only younger siblings from ASC families with YS from TD families, lends support to the idea that whether SRQ is compromised may in

part depend on whether the TD child is younger or older than the child with the disability.

9.2. Adjustment of TD younger siblings in families with ASC

According to mother reports, ASC siblings had significantly higher scores on adjustment difficulties relating to peer problems and emotional symptoms than YS from TD families. A number of studies have reported ASC siblings are at risk of adjustment problems in general (Bägenholm & Gillberg, 1991; Fisman, et al., 2000; Gold, 1993; Rodrigue, Geffken, & Morgan, 1993) and of internalising adjustment difficulties more specifically (e.g. Rao & Beidel, 2009; Ross & Cuskelly 2006). In particular the current findings concur with Lefkowitz, Crawford & Dewey (2007), who also found differences amongst ASC siblings from TD sibling pairs on measures of emotional problems and social competence but used an alternative measure of adjustment to the current study (Conners' Rating Scales-Revised (Conners, 1997) rather than the Strengths and Difficulties Questionnaire (SDQ; Goodman, Ford, Simmons, Gatward, & Meltzer, 2000). The apparent similarity of results despite different measurement methods indicates a certain robustness of these findings.

9.3. Qualitative experiences

The qualitative study (article 1) focused on listening to the perspectives of YS growing up with an OS who has ASC. The themes that emerged from the interviews link well with the quantitative reports regarding SRQ for ASC families by exploring the positively and negatively valenced experiences from sibling interactions. ASC siblings voiced a desire for more harmony, and reported that the child with ASC in the family was often angry, supporting mother reports in the quantitative study of

lower positivity and higher negativity in SRQ. Repetitive and restricted interests of OS were also highlighted by TD siblings as many shared activities revolved around computers and video games.

A major theme from these interviews was the emotional reactivity of the sibling, i.e. the difficulties involved with dealing with the ASC sibling's anger and accompanying verbal hostility and physical aggression. This often resulted in the interviewee feeling frightened, and linked with them seeing autism as a mostly negative disability. Two themes led on from this: a desire for more harmonious interactions and, in efforts to achieve this, adjustment and accommodation during time spent together. Thus play and interactions occurred mainly on the ASC child's terms, often involving computers, video games or other technology. Birth order reversal, whereby these younger siblings felt like they were older than their ASC brother or sister rather was also part of this theme. Siblings often helped or coached their older sibling and at times had satisfaction in outsmarting or realising they were more capable and confident. The fourth theme involved empathy, emotional contagion and understanding. These children reported feeling happy at times when their sibling with ASC was happy, and sad when their sibling was in a negative (sad or angry) emotional state. The final theme identified was that of ambivalence, whereby TD siblings held both positive as well as negative opinions regarding their brother or sister with ASC. They often wished things could be different and that their sibling did not have ASC, yet simultaneously expressed acceptance of the condition.

9.4. Mediating and moderating factors in determining SRQ and YS adjustment

Distinct components of OS autistic traits mediated the relationship between a child with ASC in the dyad and negativity compared to positivity in SRQ. The

potential relationship between OS autistic traits and YS adjustment was also explored in this thesis. Somewhat surprisingly traits relating to OS social and communication impairments were not associated with YS adjustment difficulties. The significant link between OS attention to detail, representing the main non-social element from the triad of impairments, and YS adjustment difficulties was not expected.

Whilst some past research has quantified autism severity, little has broken down autism related traits into component subscales. Making this distinction between different autistic traits could potentially explain inconsistencies in past research on whether SRQ is affected by having a child with ASC by helping to unpick causal pathways. Each of these ASC related traits and their association with SRQ and YS adjustment will be discussed in turn.

9.4.1. Impaired imagination

Higher levels of impaired imagination for OS were associated with YS emotional symptoms and peer problems although they did not significantly mediate or moderate this relationship. OS impaired imagination did however mediate the link between having a child with ASC in the family and positivity in SRQ. The association between imagination and positivity was supported by results from the young adult sample. Retrospective reports of less positivity in (childhood) SRQ were significantly associated with higher levels of impaired imagination for both older and younger adult siblings. This indicates that warmth and positivity in the relationship could depend on the imaginative ability of siblings, rather than viewing the autism per se as responsible for differences in SRQ between family types. Spending time playing together is an important factor in strengthening prosocial sibling relationships (Kramer, 2010). Thus how imaginative and creative the older sibling in particular

tends to be is potentially a significant driving force in fostering play and positive engagement between siblings.

9.4.2. Impaired social skills

The relationship between more negativity in the dyad and having a child with ASC in the family was mediated by impairments in OS social skills. Consequently OS with higher levels of this trait may lead to more conflict and less consideration within the relationship between siblings. Higher levels of this trait for YS were somewhat related to rivalry in young adult SRQ. At a practical level, impairment in social skills reflects a lack of tact in terms of social conventions and niceties. This could be perceived as a disregard for another individual and therefore result in hostility or negativity in the relationship.

9.4.3. Impaired mind reading

Similarly, the relationship between more negativity in the dyad and having a child with ASC in the family was also mediated by impairments in OS mind reading ability. In the same way as described above, the level of negativity in SRQ was greater when the OS had a higher degree of impaired mind reading in particular, rather than simply as a result of the OS having ASC. Higher levels of this trait were also associated with higher levels of conflict and lower levels of warmth in young adult SRQ, and with higher levels of YS emotional symptoms for children. Mind reading encompasses the ability to understand that another person has different desires and opinions to oneself. Lacking this ability to any large extent could conceivably lead to misunderstandings regarding intentions, more negative interpretations of a sibling's behaviour and subsequent retaliations or internalising of

the associated distress.

9.4.4. Attention to detail

Attention to detail was not strongly linked to SRQ in middle childhood, but both mediated and moderated the relationship between having a child with ASC in the dyad and TD YS adjustment in terms of emotional symptoms. This indicates that when a child has ASC and is also high in traits relating to attention to detail, the TD sibling is at particularly high risk of internalising difficulties. Similarly, strength in these characteristics also explained (i.e. mediated) the association between an older child with ASC and the TD younger sibling being at risk of emotional problems. Differences in self-reported levels of attention to detail also related to rivalry in young adult SRQ.

Attention to detail reflects a preference for rigidity and inflexibility in routines. A recent review regarding the social-communication element of autism and non-social domain of repetitive interests, behaviours and activities (RIBAs) concluded that the extant literature does not support a common underlying cause for these two domains, and that correlations between them are fairly weak (Mandy & Skuse, 2008). Hence it is not surprising that different traits could have potentially different consequences or influences on personal relationships such as between siblings. In general, the non-social features of ASC vary widely between individuals and are less well understood or researched than ASC social impairments (Hill & Frith, 2003). They may also be particularly confusing for a younger TD child to follow, understand and know how to react appropriately to (Ferraoli & Harris, 2010). Given the comparative strengths in piecemeal processing and preference for structure and routine for individuals with ASC, elucidating how this potentially impacts on

relationships and individual wellbeing is clearly an area for future research.

9.5. Considering SRQ and YS adjustment in ASC families

Although negativity was significantly associated with higher YS adjustment difficulties on four subscales and total difficulties, neither positivity nor negativity in SRQ mediated or moderated the link between family type and YS adjustment. Despite this, poorer SRQ may still have a number of implications for the social and emotional development of the TD child. For example, the relationship quality and interactions may influence types of YS social skills that are not being picked up by the present measure of adjustment such as frequency and quality of friendships or support and coping. Having siblings has been linked with enhanced social cognition and getting along better with friends and peers (Downey & Condron, 2004; Howe, Aquan-Assess, Bukowski, Lehoux, & Rinaldi, 2001; Perner, Ruffman & Leekam, 1994). TD children need to adapt to the needs of their sibling with ASC and are unable to interact in a ‘normal’ manner. Attributions regarding the disabled siblings behaviour and problems have been linked with TD children’s own adjustment (Dunn, 1988). Thus having a sibling with ASC may have consequences in terms of learning how to play and get along with other children, as this family dynamic does not provide the same opportunities to practice and develop theory of mind skills and imaginative play. This could therefore potentially spill over into the child’s peer arena and result in increased chances of peer problems.

Another factor to consider is that SRQ during childhood and adolescence will likely determine the nature of the sibling relationship during adulthood (Conger & Little, 2010). Since adult siblings in ASC families tend to assume certain responsibilities for their disabled brother or sister, the level of closeness and warmth

they feel for their sibling could influence how much support they provide (Seltzer, Greenberg, Orsmond & Lounds, 2005) and correspondingly how much support the individual with ASC requires from social services and government funding. Additionally, a more positive relationship is associated with better well-being of a non-disabled adult sibling (Seltzer, Greenberg, Kraus, Gordon, & Judge, 1997). As they reach adulthood themselves, the siblings of children with ASC will receive little emotional support from their brother or sister and may be at greater risk of psychopathology than the adult siblings of individuals with other disabilities (Seltzer et al., 2005). Thus interventions aimed at encouraging a warmer sibling relationship in these families could have beneficial longer-term health implications for TD siblings.

Fisman et al. (1996) also concluded that for ASC families TD child adjustment was not mediated by SRQ. Gamble and Woulbroun (1993) described the pattern of life in ASC families as involving the TD child being unable to express certain emotions and thus have their needs for affection met because the ASC sibling doesn't understand and/or cannot reciprocate the emotional expression. Fisman et al. (1996) suggested that a TD sibling might internalise their distress rather than risking overt hostility towards the sibling with ASC. Internalising the distress could mean engaging in negative attention seeking behaviours in order to gain attention and satisfy their own needs for nurturance. Thus a transactional mechanism may be at work, whereby SRQ is not a moderator/mediator of adjustment in these families due to the presence of these other factors.

9.6. The dimensional view of ASC

Throughout the quantitative studies presented the dimensional view of ASC was taken, whereby it was assumed that all individuals score somewhere on the

spectrum of tendencies towards ASC characteristics or traits (Baron-Cohen et al., 2001). The results endorsed this approach, with Autism Quotient scores from young adults and TD children who do not have a diagnosis of ASC being normally distributed. By splitting the AQ into four component subscales, the three quantitative studies presented showed that different ASC related traits have different influences in terms of typically developing sibling adjustment and sibling relationship quality in middle childhood. These traits were also correlated with adult sibling relationship quality in the general population. Although associations were not fully consistent across the two studies, links between these mother reports of SRQ and OS ASC traits in middle childhood were substantiated to some extent by retrospective accounts of SRQ by young adults and their self-reported ASC traits. It is possible that in young adulthood different ASC related (or other) traits may become more important for a warm and positive sibling relationship. It is suggested that future research looking at family relationships continue to take into account the presence of autistic traits in the general population and further investigate and potentially confirm their dimensional nature.

9.7. Similarity and difference in AQ traits

A smaller difference in AQ score and in impaired social skills amongst children was related to more positivity in SRQ. Similarly, for young adults, a post-hoc look at the attention to detail subscale indicated that although OS and YS scores correlated significantly with rivalry in ASRQ, the association was in the opposite direction for OS compared to YS. By again computing a difference score and taking this into account we found that when siblings were more similar in their level of attention to detail the level of rivalry was significantly lower. Together these results

indicate that similarity in autistic traits fosters a more positive sibling relationship. Furman & Lanthier (1996) also noted that personality and temperamental characteristics are more closely related to negative interaction patterns than positive elements of the relationship in the general population. Similarity in personality fosters a lower frequency of hostile interactions in both the literature regarding middle childhood (Brody, 1996) and adult relationships (Hinde, 1979).

9.8. Strengths and limitations and future directions

Using a clinical population was a strength of the present research, although there was some difficulty in recruiting a large sample of families with ASC children. It was thus necessary to conduct non-random sampling. Difficulties involved are not unusual within this field and other studies have used similar recruitment methods (e.g. Rivers & Stonemen, 2008). In recruiting for this study we relied on families volunteering themselves and providing accurate information regarding the ASC diagnosis. The sample was recruited by advertising at special ASC school classes, a primary autism diagnosis centre, ASC parent support groups, and on the National Autistic Society website. Having mothers report on each child's autistic traits using the AQ substantiated the assumption that all these families did in fact have a child with ASC. We can of course draw no conclusions regarding families that declined to take part or those siblings that did not return questionnaires in the adult SRQ study. Future research should also consider the autistic traits of parents who are being asked to report on the same in their children. It may be that parents who score highly on such traits are not as sensitive when it comes to identifying them in their offspring, or have a different concept of what constitutes normal or often. Using a more sophisticated statistical analysis, for example multi-level modelling, to take this

variance into account would therefore be beneficial.

Examining in detail differences between younger and older TD siblings in ASC families is a point for future research to take into account in terms of the influence of specific autistic traits. By focusing on only younger siblings, generalisability of the present conclusions are limited and cannot be assumed to apply to OS of children with ASC. However they do support previous findings suggesting that children who are younger TD siblings of a child with ASC may be a particularly vulnerable group compared to those who are older (Hastings, 2003a).

Multiple informants on the sibling relationship in middle childhood and adjustment are warranted in future research, particularly as parent ratings may be subject to contrast effects when completing questionnaires for both children in the dyad (Saudino, McGuire, Reiss, Hetherington & Plomin, 1995). It is possible that mothers compare their TD child with their ASC who has child, and that the TD child appears relatively “normal” (e.g. without many autistic traits) simply by comparison. Article 3 addressed this need for multiple informants in part by looking at dyadic accounts of current adult SRQ and retrospective SRQ. Younger and older adult siblings agreed substantially on positive and negative dimensions of SRQ. Future research should continue to focus on taking into account the views of both siblings in a dyad.

In line with criticisms of research using clinical populations noted by Meadan et al. (2010), a larger sample size for the studies in this thesis would be ideal. Some research has indicated that parents may have a more negative view of their TD children’s coping and relationship with siblings than the children themselves (e.g. Sharpe & Rossiter, 2002). It is interesting to note that subsequent studies which have used TD siblings of children with ASC as informants have shown good agreement

between parent and child perceptions (Lefkowitz et al., 2007; Verte, Roeyers & Buysse, 2003). Reasonable agreement regarding adjustment of ASC siblings has also been obtained using parent and teacher ratings. For example, Fisman et al. (1996) found both parents and teachers reported significantly higher internalising in siblings of children with PDD.

Other limitations to the current work include the use of a cross-sectional samples, which precludes from drawing causal conclusions. It may be that, although specific autistic traits were associated with negativity and positivity in SRQ, they do not actually result in the SRQ outcomes measured. Indeed another variable unaccounted for as yet (and therefore not measured) may link both, such as parental differential treatment. Similarly, YS adjustment may influence SRQ rather than vice versa. Subsequent longitudinal studies could help disentangle these associations and give more room for attributing causality by initially taking account of autistic traits and behaviour and then assessing SRQ and adjustment difficulties at the follow-up time point. Additionally, the use of retrospective reports in study 3 was not ideal, and such work would benefit from a prospective longitudinal design. As mentioned briefly above, more sophisticated analytical methods could be utilised in future research on this topic. This could include multi-level modelling, which would allow for variance at each level (eg. within the family and within the child) to be accounted for.

A number of other potential mediating or moderating variables, which may interact with those identified in this research, could be incorporated in future studies. These include reports of parental and TD child stress, the parent-child relationship and in particular parental differential treatment and whether this is perceived as fair by the TD child. It is also possible that taking into account the cultural context of the

families with children with ASC could be an important determinant of SRQ, TD sibling expectations and psychological well being (Meadan et al., 2010).

9.9. Potential clinical implications

9.9.1. TD siblings of children with ASC

With an ultimate goal to improve and enhance the quality of life for all members of a family where an individual has ASC, practitioners need to be able to offer effective and practical support (Meadan et al., 2010). In order to do this, a thorough understanding of the difficult behavioural, emotional, and social issues faced by TD siblings is required. In the qualitative study presented children were very forthcoming and willing to explain their relationship experiences. These siblings verbalised a desire for less negativity in the relationship and for their sibling to be less angry and reactive. Future research should consider possible consequences of having these lower levels of positivity and higher levels of negativity than TD families, and interventions would benefit from targeting these areas and helping the TD child to cope with nature of the dyadic interactions.

Retrospective perceptions of SRQ in middle childhood broadly backed up the reports of mothers regarding the association between imagination impairments and lower positivity in SRQ. Implications from these studies are therefore that focusing on helping siblings to play imaginative games together could foster more positive SRQ. Indeed, positive engagement including play has been cited as an essential competency for children's prosocial sibling relationships (Kramer, 2010). Awareness of attention to detail as influential in YS adjustment means that helping TD siblings to understand that aspect of autism in particular, i.e. the rigidity and inflexibility of the ASC child, might be of benefit. A better understanding of autism by siblings has been associated

with better SRQ (Roeyers & Mycke, 1995) and thus understanding of this dimension in particular could potentially help TD siblings to cope effectively with the situation rather than internalising or externalising their distress.

The findings from qualitative accounts fit with the view that siblings of children with ASC seem to try and find a balance between their own needs and those of their (presumably less flexible) brother or sister (Burton & Parks, 1994). Importantly, there were also a number of very “normal” behaviour patterns reported. These were the times when their sibling assisted or helped them (again, often revolving around technology or computer-based knowledge), and were appreciated and interpreted as “fun” times. Given that siblings interviewed in the present study were not in fact only emphasising negative interactions or feelings, it may be important to promote communication between parents and TD children so that parents are aware of the wider picture. It has repeatedly been found that these families with an ASC child have higher levels of stress than those with a child with DS, TD children or those with other behaviour disorders (eg. Dumas, Wolf, Fisman, & Culligan, 1991; Gray, 1994). By communicating the more positive views siblings have of their ASC brother or sister as well as those that are negative parents might be relieved of some negative emotions and resulting stress or feelings of guilt.

9.9.2. Children with ASC

TD siblings have been cited as an important source of support and learning for children with ASC (Travis & Sigman, 1998). It was suggested therefore, that any interventions to improve social relationships with ASC children could attempt to build upon relative existing strengths, such as using sibling relationships as an intermediate step (Travis & Sigman, 1998). Strategies to foster and encourage a more positive

relationship could result in the TD sibling being more willing to spend time with their brother or sister. This could potentially mean more opportunities for the child with ASC to imitate and learn from their brother and sister, and the sibling effectively being this intermediate step in the child with ASC's subsequent or concurrent relationships with peers and social development.

9.10. Sibling relationships and autistic traits in the general population

Doody, Hastings, O'Neill, & Grey (2010) suggest that a less advanced development of theory of mind or communicative ability of an individual may underlie the perception of less emotional and instrumental support, intimacy and affection, i.e. less warmth in the relationship. This would be consistent with greater impairments in terms of autistic traits. In the present work autistic traits did show significant links with sibling relationships in middle childhood and young adulthood. Findings from the adult SRQ study support the view that autistic traits may influence the quality of adult siblings relationships and add to previous studies looking at both the general and ASC populations. Adult siblings are sources of emotional and practical support (Conger & Little, 2010), and relationships during childhood are reasonable indicators of SRQ in adulthood. Again, considering the association between negative elements of adult SRQ and attention to detail would seem an appropriate area to examine. A meta awareness of whether siblings have high preferences towards predictability, routine and seeing the world in terms of systems could help adult siblings to better understand the nature of their dyadic relationships.

9.11. General conclusions

Breaking down the autistic triad of impairments allowed an examination of

whether specific autism related traits were responsible for or contributed to sibling relationship quality and YS adjustment in individual ways, and further elucidated the impact of ASC on TD siblings. This followed on from literature indicating that autism be considered a dimensional disorder with traits and characteristics present on a continuum between the general population and those on the higher end reaching a clinical cut-off for diagnosis of ASC. That siblings influence each other's development is not new, but exactly how individual autistic traits of siblings lead to positivity and negativity in sibling relationship quality and wellbeing is an area warranting further investigation, particularly for families with a child who has ASC.

In sum, the present studies add weight to a growing body of literature (for review see Meadan et al., 2010) suggesting that ASC siblings are indeed a group at risk of negative consequences in terms of SRQ and adjustment. The studies also support the view that autistic traits are associated with a variety of interpersonal relationships. In particular, different trait domains relating to ASC seem to function differently in influencing specific aspects of the sibling relationship as well as sibling socio-emotional development in terms of psychological adjustment.

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Appendix

Interview schedule and questionnaires

Study 1 Interview Schedule

Questions:

- 1) I have some paper here for you to draw your family on
- 2) Tell me about your brother/sister (X)
 - a. What do you like about them?
 - b. What is the best thing about (X)?
 - c. What do you dislike about them?
 - d. What is the worst thing/most difficult thing about (X)?
- 3) Can you tell me about a time when you and (X) had a good time together?
- 4) Can you tell me about a time when you and (X) didn't have a good time together?
- 5) Tell me about a time when you and (X) had an argument or a fight
 - a. What did your mum or dad say?
 - b. Did you think that was fair or not very fair?
- 6) Tell me about a time when (X) did something that made you feel;
 - a. Happy
 - b. Sad
 - c. Angry/annoyed
 - d. Embarrassed
 - e. Frightened
- 7) Tell me about some good games you play together
 - a. How does that game go?
 - b. What happens when you play together
- 8) Is there anything you wish you could play with (X) that you can't?
- 9) When you play with your friends does (X) play with you all too?
- 10) Would you like them to be any different to how they are?

- a. What would you like to be different?
 - b. What difference would that make? (Then what do you think might happen if (X) was [like that]?)
- 11) Tell me about a time when you were nice to each other
- 12) Tell me about when you did something that made (X) feel
- a. Happy
 - b. Sad
 - c. Angry?
- 13) Do you talk with (X) a lot?
- a. Is there anything you wish you could talk with (X) about?
- 14) In what ways do you think (X) is any different to other people's brothers or sisters?
- 15) What do you think autism means?
- a. How do you think that effects (X)
 - b. Have you ever thought about what (X) would be like if they weren't autistic?
 - c. How might your family be different then?
- 16) Are there many times when you've wished you could do something but you weren't allowed because of (X)?
- a. Can you tell me what happened?
- 17) Is there anything you wish your whole family could do more?



QUESTIONNAIRE BOOKLET 1

(FOR MUM)

Please try to answer all the questions in this booklet. If you prefer not to answer a particular question please do not do so. You and your child will not be identified by name in the research.

Consent Form

I voluntarily agree to take part and to allow my children to take part in KASMS- Kids with ASC; a study with mothers and siblings.

I have been given the opportunity to ask questions and to discuss the study.

I understand that all the information that I will provide in this study will be kept in the strictest confidence and will be used only for research purposes. I am aware that some of the questions are of a personal nature, and understand that I can choose not to answer any question if I would prefer not to.

I understand that I am free to withdraw from the study at any time without providing a reason for doing so.

Name of older child: ASC? (Y/N) Age.....

Name of younger child: ASC? (Y/N) Age.....

Other siblings (gender and ages):

.....

.....

Mother's name:

Mother's signature/email address: Date:

Researcher: ...Zoë Wheeler...

Researcher's signature/email address: Z.Wheeler@sussex.ac.uk (19/5/08)

Part One: About Your Children

1. What Your Children are Like

For each statement below, please circle or put an 'x' next to the number beside each item that indicates the most appropriate response. It would help us if you answered all items as best as you can, even if you are not absolutely certain or if the statement sounds silly! Please give your answers on the basis of each child's behaviour over the last six months.

a. Child 1 (Older Sibling) – Name & age: _____

		Certainly True	Sometimes True	Not True
1.	Considerate of other people's feelings	1	2	3
2.	Restless, overactive, cannot stay still for long	1	2	3
3.	Often complains of headaches, stomach-aches or sickness	1	2	3
4.	Shares readily with other children (treats, toys, pencils etc.)	1	2	3
5.	Often has temper tantrums or hot tempers	1	2	3
6.	Rather solitary, tends to play alone	1	2	3
7.	Generally obedient, usually does what adults request	1	2	3
8.	Many worries, often seems worried	1	2	3
9.	Helpful if someone is hurt, upset or feeling ill	1	2	3
10.	Constantly fidgeting or squirming	1	2	3
11.	Has at least one good friend	1	2	3
12.	Often fights with other children or bullies them	1	2	3
13.	Often unhappy, down-hearted or tearful	1	2	3
14.	Generally liked by other children	1	2	3
15.	Easily distracted, concentration wanders	1	2	3
16.	Nervous or clingy in new situations, easily loses confidence	1	2	3
17.	Kind to younger children	1	2	3
18.	Often lies or cheats	1	2	3

		Certainly True	Sometimes True	Not True
19.	Picked on or bullied by other children	1	2	3
20.	Often volunteers to help others (parents, teachers, other children)	1	2	3
21.	Thinks things out before acting	1	2	3
22.	Steals from home, school or elsewhere	1	2	3
23.	Gets on better with other adults than with other children	1	2	3
24.	Many fears, easily scared	1	2	3
25.	Sees tasks through to the end, good attention span	1	2	3

Child 1- Preferences & behaviour

Again, for each statement below, please circle or place an 'X' in the box next to each item that indicates the most appropriate response for your eldest child.

	Definitely Agree	Slightly Agree	Slightly Disagree	Definitely Disagree
1. S/he prefers to do things with others rather than on her/his own.				
2. S/he prefers to do things the same way over and over again.				
3. If s/he tries to imagine something, s/he finds it very easy to create a picture in her/his mind.				
4. S/he frequently gets so strongly absorbed in one thing that s/he loses sight of other things.				
5. S/he often notices small sounds when others do not.				
6. S/he usually notices house numbers or similar strings of information.				
7. S/he has difficulty understanding rules for polite behavior.				
8. When s/he is read a story, s/he can easily imagine what the characters might look like.				
9. S/he is fascinated by dates.				
10. In a social group, s/he can easily keep track of several different people's conversations.				
11. S/he finds social situations easy.				
12. S/he tends to notice details that others do not.				

	Definitely Agree	Slightly Agree	Slightly Disagree	Definitely Disagree
13. S/he would rather go to a library than a birthday party.				
14. S/he finds making up stories easy.				
15. S/he is drawn more strongly to people than to things.				
16. S/he tends to have very strong interests, which s/he gets upset about if s/he can't pursue.				
17. S/he enjoys social chit-chat.				
18. When s/he talks, it isn't always easy for others to get a word in edgeways.				
19. S/he is fascinated by numbers.				
20. When s/he is read a story, s/he finds it difficult to work out the characters' intentions or feelings.				
21. S/he doesn't particularly enjoy fictional stories.				
22. S/he finds it hard to make new friends.				
23. S/he notices patterns in things all the time.				
24. S/he would rather go to the cinema than a museum.				
25. It does not upset him/her if his/her daily routine is disturbed.				
26. S/he doesn't know how to keep a conversation going with her/his peers.				
27. S/he finds it easy to "read between the lines" when someone is talking to her/him.				
28. S/he usually concentrates more on the whole picture, rather than the small details.				
29. S/he is not very good at remembering phone numbers.				
30. S/he doesn't usually notice small changes in a situation, or a person's appearance.				

	Definitely Agree	Slightly Agree	Slightly Disagree	Definitely Disagree
31. S/he knows how to tell if someone listening to him/her is getting bored.				
32. S/he finds it easy to go back and forth between different activities.				
33. When s/he talks on the phone, s/he is not sure when it's her/his turn to speak.				
34. S/he enjoys doing things spontaneously.				
35. S/he is often the last to understand the point of a joke.				
36. S/he finds it easy to work out what someone is thinking or feeling just by looking at their face.				
37. If there is an interruption, s/he can switch back to what s/he was doing very quickly.				
38. S/he is good at social chit-chat.				
39. People often tell her/him that s/he keeps going on and on about the same thing.				
40. When s/he was in preschool, s/he used to enjoy playing games involving pretending with other children.				
41. S/he likes to collect information about categories of things (e.g. types of car, types of bird, types of train, types of plant, etc.).				
42. S/he finds it difficult to imagine what it would be like to be someone else.				
43. S/he likes to plan any activities s/he participates in carefully.				
44. S/he enjoys social occasions.				
45. S/he finds it difficult to work out people's intentions.				
46. New situations make him/her anxious.				
47. S/he enjoys meeting new people.				
48. S/he is good at taking care not to hurt other people's feelings.				

49. S/he is not very good at remembering people's date of birth.				
50. S/he finds it very easy to play games with children that involve pretending.				

Please answer the next set of questions with reference to your younger child by circling the number or placing an 'x' in the appropriate box.

b. Child 2 (Younger Sibling) – Name & Age: _____

		Certainly True	Sometimes True	Not True
1.	Considerate of other people's feelings	1	2	3
2.	Restless, overactive, cannot stay still for long	1	2	3
3.	Often complains of headaches, stomach-aches or sickness	1	2	3
4.	Shares readily with other children (treats, toys, pencils etc.)	1	2	3
5.	Often has temper tantrums or hot tempers	1	2	3
6.	Rather solitary, tends to play alone	1	2	3
7.	Generally obedient, usually does what adults request	1	2	3
8.	Many worries, often seems worried	1	2	3
9.	Helpful if someone is hurt, upset or feeling ill	1	2	3
10.	Constantly fidgeting or squirming	1	2	3
11.	Has at least one good friend	1	2	3
12.	Often fights with other children or bullies them	1	2	3
13.	Often unhappy, down-hearted or tearful	1	2	3
14.	Generally liked by other children	1	2	3
15.	Easily distracted, concentration wanders	1	2	3
16.	Nervous or clingy in new situations, easily loses confidence	1	2	3
17.	Kind to younger children	1	2	3

		Certainly True	Sometimes True	Not True
18.	Often lies or cheats	1	2	3
19.	Picked on or bullied by other children	1	2	3
20.	Often volunteers to help others (parents, teachers, other children)	1	2	3
21.	Thinks things out before acting	1	2	3
22.	Steals from home, school or elsewhere	1	2	3
23.	Gets on better with other adults than with other children	1	2	3
24.	Many fears, easily scared	1	2	3
25.	Sees tasks through to the end, good attention span	1	2	3

Child 2- Preferences & behaviour

Again, for each statement below, please put an 'X' in the box next to each item that indicates the most appropriate response for your younger child.

	Definitely Agree	Slightly Agree	Slightly Disagree	Definitely Disagree
1. S/he prefers to do things with others rather than on her/his own.				
2. S/he prefers to do things the same way over and over again.				
3. If s/he tries to imagine something, s/he finds it very easy to create a picture in her/his mind.				
4. S/he frequently gets so strongly absorbed in one thing that s/he loses sight of other things.				
5. S/he often notices small sounds when others do not.				
6. S/he usually notices house numbers or similar strings of information.				
7. S/he has difficulty understanding rules for polite behavior.				
8. When s/he is read a story, s/he can easily imagine what the characters might look like.				

	Definitely Agree	Slightly Agree	Slightly Disagree	Definitely Disagree
9. S/he is fascinated by dates.				
10. In a social group, s/he can easily keep track of several different people's conversations.				
11. S/he finds social situations easy.				
12. S/he tends to notice details that others do not.				
13. S/he would rather go to a library than a birthday party.				
14. S/he finds making up stories easy.				
15. S/he is drawn more strongly to people than to things.				
16. S/he tends to have very strong interests, which s/he gets upset about if s/he can't pursue.				
17. S/he enjoys social chit-chat.				
18. When s/he talks, it isn't always easy for others to get a word in edgeways.				
19. S/he is fascinated by numbers.				
20. When s/he is read a story, s/he finds it difficult to work out the characters' intentions or feelings.				
21. S/he doesn't particularly enjoy fictional stories.				
22. S/he finds it hard to make new friends.				
23. S/he notices patterns in things all the time.				
24. S/he would rather go to the cinema than a museum.				
25. It does not upset him/her if his/her daily routine is disturbed.				
26. S/he doesn't know how to keep a conversation going with her/his peers.				

	Definitely Agree	Slightly Agree	Slightly Disagree	Definitely Disagree
27. S/he finds it easy to “read between the lines” when someone is talking to her/him.				
28. S/he usually concentrates more on the whole picture, rather than the small details.				
29. S/he is not very good at remembering phone numbers.				
30. S/he doesn’t usually notice small changes in a situation, or a person’s appearance.				
31. S/he knows how to tell if someone listening to him/her is getting bored.				
32. S/he finds it easy to go back and forth between different activities.				
33. When s/he talks on the phone, s/he is not sure when it’s her/his turn to speak.				
34. S/he enjoys doing things spontaneously.				
35. S/he is often the last to understand the point of a joke.				
36. S/he finds it easy to work out what someone is thinking or feeling just by looking at their face.				
37. If there is an interruption, s/he can switch back to what s/he was doing very quickly.				
38. S/he is good at social chit-chat.				
39. People often tell her/him that s/he keeps going on and on about the same thing.				
40. When s/he was in preschool, s/he used to enjoy playing games involving pretending with other children.				
41. S/he likes to collect information about categories of things (e.g. types of car, types of bird, types of train, types of plant, etc.).				
42. S/he finds it difficult to imagine what it would be like to be someone else.				
43. S/he likes to plan any activities s/he participates in carefully.				
44. S/he enjoys social occasions.				

45. S/he finds it difficult to work out people's intentions.				
46. New situations make him/her anxious.				
47. S/he enjoys meeting new people.				
48. S/he is good at taking care not to hurt other people's feelings.				
49. S/he is not very good at remembering people's date of birth.				
50. S/he finds it very easy to play games with children that involve pretending.				

C. Your children as brothers and sisters

This section asks about your children's relationship with each other. Please respond only about the two children taking part in the project and circle the appropriate response.

1. Companionship

Some brothers and sisters spend a lot of time together, whereas others have very different interests and aren't together very much. Being together can be when both children are in the same room but not necessarily playing together (e.g., mealtimes, watching television).

During the week how much are your two children together?

Almost never (few minutes in morning and evening each day)	Hardly ever (10-15 minutes in morning and evening each day)	Somewhat (an hour or two each day)	Pretty often (3 or 4 hours each day)	Quite a bit (good part of the each day)	Just about all the time (most of each day)
0	1	2	3	4	5

2. Playing Together: Out of the time your children spend together, how often do they play together?

(e.g., interacting with each other around a shared activity, rather than watching TV or eating a meal together)

Almost never (less than 5% of time together)	Hardly ever (about 10% of time together)	Occasionally (about a fifth of time together)	Sometimes (about a third or more of time together)	Pretty often (at least half of time together)	Regularly (almost all of time together, 75-100%)
0	1	2	3	4	5

3. Pretend Play

How often do your children play make-believe games together? (e.g., playing doctors and nurses, monsters, spacemen, superman, mother and babies)

Almost never (less than 5% of time together)	Hardly ever (about 10% of time together)	Occasionally (about a fifth of time together)	Sometimes (about a third or more of time together)	Pretty often (at least half of time together)	Regularly (almost all of time together, 75-100%)
0	1	2	3	4	5

4. Quarrels

Most brothers and sisters argue and quarrel. How often do your children squabble when they are together?

Almost never (less than 5% of time together)	Hardly ever (about 10% of time together)	Occasionally (about a fifth of time together)	Sometimes (about a third or more of time together)	Pretty often (at least half of time together)	Regularly (almost all of time together, 75-100%)
0	1	2	3	4	5

5. Wanting to Play Together

How often are each of your children interested in playing together?

	Almost never (less than 5% of time together)	Hardly ever (about 10% of time together)	Occasionally (about a fifth of time together)	Sometimes (about a third of time together)	Pretty often (at least half of time together)	Regularly (almost all of time together, 75-100%)
Child A _____	0	1	2	3	4	5
Child B _____	0	1	2	3	4	5

6. Affection

How often do your children show affection for each other on a day-to-day basis? (e.g., being affectionate in their play, being pleased to see each other if separated at school)?

	Almost never (less than 5% of time together)	Hardly ever (about 10% of time together)	Occasionally (about a fifth of time together)	Sometimes (about a third of time together)	Pretty often (at least half of time together)	Regularly (almost all of time together, 75- 100%)
Child A _____	0	1	2	3	4	5
Child B _____	0	1	2	3	4	5

7. Comforting Each Other

a. If one of the children is hurt or upset, how often do your children show concern at the other's distress if one of them did not cause the distress?

	Almost never (less than 5% of time together)	Hardly ever (about 10% of time together)	Occasionally (about a fifth of time together)	Sometimes (about a third of time together)	Pretty often (at least half of time together)	Regularly (almost all of time together, 75- 100%)
Child A _____	0	1	2	3	4	5
Child B _____	0	1	2	3	4	5

b. How often do your children show concern at the other's distress if one of them was the cause of distress?

	Almost never (less than 5% of time together)	Hardly ever (about 10% of time together)	Occasionally (about a fifth of time together)	Sometimes (about a third of time together)	Pretty often (at least half of time together)	Regularly (almost all of time together, 75- 100%)
Child A _____	0	1	2	3	4	5

Child B						
_____	0	1	2	3	4	5

8. Teaching and Helping Each Other

How often do your children spontaneously teach or help each other? (e.g., if one needs help with a chore or working something out)?

	Almost never (less than 5% of time together)	Hardly ever (about 10% of time together)	Occasionally (about a fifth of time together)	Sometimes (about a third of time together)	Pretty often (at least half of time together)	Regularly (almost all of time together, 75-100%)
Child A	0	1	2	3	4	5

Child B	0	1	2	3	4	5

9. Caretaking and Being Taken Care Of

How willing is each child to take care of the other? (e.g., how willing would the older child be to help out, and how willing would the younger child to go along)?

	Not willing (always or almost always refuses to do so)	Very unwilling (generally refuses to do so)	Occasionally willing (usually complains but does it)	Sometimes willing (sometimes resistant)	Usually willing (generally no complaints)	Always willing (hardly ever complains)
Child A	0	1	2	3	4	5

Child B	0	1	2	3	4	5

10. Physical Fights

How often do your children's quarrels turn into hitting one another?

	Almost never (less than 5% of time together)	Hardly ever (about 10% of time together)	Occasionally (about a fifth of time together)	Sometimes (about a third of time together)	Pretty often (at least half of time together)	Regularly (almost all of time together, 75-100%)
Child A _____	0	1	2	3	4	5
Child B _____	0	1	2	3	4	5

11. Sharing

How much do your children share their possessions?

	Almost never	Rarely	Shares only a few things	Shares some things (but minds about a few special things)	Shares most things (but occasionally refuses to share something special)	Shares just about anything
Child A _____	0	1	2	3	4	5
Child B _____	0	1	2	3	4	5

12. Competing with each other

How often do your children make competitive remarks or act competitively?

(e.g., if one has just done something, does the other insist on showing that he/she can do it too, or better)?

	Almost never (once a month or less)	Hardly ever (less than once a week)	Occasionally (about once a week)	Sometimes (couple of times a week)	Pretty often (several times a week)	Regularly (just about every day)
Child A _____	0	1	2	3	4	5
Child B _____	0	1	2	3	4	5

13. Jealousy and Rivalry

Most children feel jealous at times of the attention and affection their brothers and sisters receive from their parents.

How often do each of your children appear jealous?

(e.g., by interrupting/disrupting the game you or your partner is playing with their sibling, or by being naughty).

	Almost never (once a month or less)	Hardly ever (less than once a week)	Occasionally (about once a week)	Sometimes (couple of times a week)	Pretty often (several times a week)	Regularly (just about every day)
Child A	0	1	2	3	4	5
Child B	0	1	2	3	4	5

Part Two: About You

The following section asks about your personal preferences.

How to fill out the questionnaire:

Below is a list of statements. Please read each statement very carefully and rate how strongly you agree or disagree with it by circling your answer.

1. I prefer to do things with others rather than on my own.	definitely agree	slightly agree	slightly disagree	definitely disagree
2. I prefer to do things the same way over and over again.	definitely agree	slightly agree	slightly disagree	definitely disagree
3. If I try to imagine something, I find it very easy to create a picture in my mind.	definitely agree	slightly agree	slightly disagree	definitely disagree
4. I frequently get so strongly absorbed in one thing that I lose sight of other things.	definitely agree	slightly agree	slightly disagree	definitely disagree
5. I often notice small sounds when others do not.	definitely agree	slightly agree	slightly disagree	definitely disagree

6. I usually notice car number plates or similar strings of information.	definitely agree	slightly agree	slightly disagree	definitely disagree
7. Other people frequently tell me that what I've said is impolite, even though I think it is polite.	definitely agree	slightly agree	slightly disagree	definitely disagree
8. When I'm reading a story, I can easily imagine what the characters might look like.	definitely agree	slightly agree	slightly disagree	definitely disagree
9. I am fascinated by dates.	definitely agree	slightly agree	slightly disagree	definitely disagree
10. In a social group, I can easily keep track of several different people's conversations.	definitely agree	slightly agree	slightly disagree	definitely disagree
11. I find social situations easy.	definitely agree	slightly agree	slightly disagree	definitely disagree
12. I tend to notice details that others do not.	definitely agree	slightly agree	slightly disagree	definitely disagree
13. I would rather go to a library than a party.	definitely agree	slightly agree	slightly disagree	definitely disagree
14. I find making up stories easy.	definitely agree	slightly agree	slightly disagree	definitely disagree
15. I find myself drawn more strongly to people than to things.	definitely agree	slightly agree	slightly disagree	definitely disagree
16. I tend to have very strong interests which I get upset about if I can't pursue.	definitely agree	slightly agree	slightly disagree	definitely disagree
17. I enjoy social chit-chat.	definitely agree	slightly agree	slightly disagree	definitely disagree
18. When I talk, it isn't always easy for others to get a word in edgeways.	definitely agree	slightly agree	slightly disagree	definitely disagree
19. I am fascinated by numbers.	definitely agree	slightly agree	slightly disagree	definitely disagree
20. When I'm reading a story, I find it difficult to work out the characters' intentions.	definitely agree	slightly agree	slightly disagree	definitely disagree
21. I don't particularly enjoy reading fiction.	definitely agree	slightly agree	slightly disagree	definitely disagree
22. I find it hard to make new friends.	definitely agree	slightly agree	slightly disagree	definitely disagree
23. I notice patterns in things all the time.	definitely agree	slightly agree	slightly disagree	definitely disagree

24. I would rather go to the theatre than a museum.	definitely agree	slightly agree	slightly disagree	definitely disagree
25. It does not upset me if my daily routine is disturbed.	definitely agree	slightly agree	slightly disagree	definitely disagree
26. I frequently find that I don't know how to keep a conversation going.	definitely agree	slightly agree	slightly disagree	definitely disagree
27. I find it easy to "read between the lines" when someone is talking to me.	definitely agree	slightly agree	slightly disagree	definitely disagree
28. I usually concentrate more on the whole picture, rather than the small details.	definitely agree	slightly agree	slightly disagree	definitely disagree
29. I am not very good at remembering phone numbers.	definitely agree	slightly agree	slightly disagree	definitely disagree
30. I don't usually notice small changes in a situation, or a person's appearance.	definitely agree	slightly agree	slightly disagree	definitely disagree
31. I know how to tell if someone listening to me is getting bored.	definitely agree	slightly agree	slightly disagree	definitely disagree
32. I find it easy to do more than one thing at once.	definitely agree	slightly agree	slightly disagree	definitely disagree
33. When I talk on the phone, I'm not sure when it's my turn to speak.	definitely agree	slightly agree	slightly disagree	definitely disagree
34. I enjoy doing things spontaneously.	definitely agree	slightly agree	slightly disagree	definitely disagree
35. I am often the last to understand the point of a joke.	definitely agree	slightly agree	slightly disagree	definitely disagree
36. I find it easy to work out what someone is thinking or feeling just by looking at their face.	definitely agree	slightly agree	slightly disagree	definitely disagree
37. If there is an interruption, I can switch back to what I was doing very quickly.	definitely agree	slightly agree	slightly disagree	definitely disagree
38. I am good at social chit-chat.	definitely agree	slightly agree	slightly disagree	definitely disagree
39. People often tell me that I keep going on and on about the same thing.	definitely agree	slightly agree	slightly disagree	definitely disagree

40. When I was young, I used to enjoy playing games involving pretending with other children.	definitely agree	slightly agree	slightly disagree	definitely disagree
41. I like to collect information about categories of things (e.g. types of car, types of bird, types of train, types of plant, etc.).	definitely agree	slightly agree	slightly disagree	definitely disagree
42. I find it difficult to imagine what it would be like to be someone else.	definitely agree	slightly agree	slightly disagree	definitely disagree
43. I like to plan any activities I participate in carefully.	definitely agree	slightly agree	slightly disagree	definitely disagree
44. I enjoy social occasions.	definitely agree	slightly agree	slightly disagree	definitely disagree
45. I find it difficult to work out people's intentions.	definitely agree	slightly agree	slightly disagree	definitely disagree
46. New situations make me anxious.	definitely agree	slightly agree	slightly disagree	definitely disagree
47. I enjoy meeting new people.	definitely agree	slightly agree	slightly disagree	definitely disagree
48. I am a good diplomat.	definitely agree	slightly agree	slightly disagree	definitely disagree
49. I am not very good at remembering people's date of birth.	definitely agree	slightly agree	slightly disagree	definitely disagree
50. I find it very easy to play games with children that involve pretending.	definitely agree	slightly agree	slightly disagree	definitely disagree

SPECIAL NEEDS (delete/fill in as appropriate):

	Child A- Older (name) _____		Child B- Younger (name) _____	
Have teachers or health visitors ever expressed any concern about his/her development?	Yes	No	Yes	No
If yes, please specify:				
Has he/she ever been diagnosed with any of the following?:				
Language delay	Yes	No	Yes	No
Hyperactivity/Attention Deficit Disorder	Yes	No	Yes	No
Hearing or visual difficulties	Yes	No	Yes	No
Autism Spectrum condition, incl.	Yes	No	Yes	No
Asperger's Syndrome				
A Physical disability	Yes	No	Yes	No
Other (please specify)				
IQ Score (if previously assessed- e.g. WISC)				



About You and Your Household

Section A About you

Sex:.....

Date of birth:..... Today's Date.....

1. Level of Education:

You

- ☐ None
- ☐ CSE (Grade 2, 3, 4, 5) **or** GCSE (Grades D, E, F, G).

How many? _____

- ☐ CSE (Grade 1) **or** 'O' Level (A, B, C) **or** GCSE (Grades A, B, C).

How many? _____

- ☐ 'A' Level, 'S' Level

How many? _____

- ☐ Higher National Certificate (HNC)

- ☐ Higher National Diploma (HND)

- ☐ Undergraduate degree.

Please describe:

- ☐ Postgraduate qualification (e.g., Masters, PhD).

Please describe:

- ☐ Other. *Please describe:*

Your partner

- ☐ None
- ☐ CSE (Grade 2, 3, 4, 5) **or** GCSE (Grades D, E, F, G).

How many? _____

- ☐ CSE (Grade 1) **or** 'O' Level (A, B, C) **or** GCSE (Grades A, B, C).

How many? _____

- ☐ 'A' Level, 'S' Level

How many? _____

- ☐ Higher National Certificate (HNC)

- ☐ Higher National Diploma (HND)

- ☐ Undergraduate degree.

Please describe:

- ☐ Postgraduate qualification (e.g., Masters, PhD).

Please describe:

- ☐ Other. *Please describe:*

Section B: About your Job

2. Are you working at the moment or are you at home with the children? *(please tick one)*

You

☐ Yes ☐ No ☐ Staying at home to look
after the children

Number of hours a week: _____

Your partner

☐ Yes ☐ No ☐ Staying at home to look
after the children

Number of hours a week: _____

3. What was/is your most recent occupation? *(please state full job title)*

You

Your partner

4. Did you need any special qualification for your job?

You

☐ Yes ☐ No ☐ Don't Know

If YES, please describe:

Your partner

☐ Yes ☐ No ☐ Don't Know

If YES, please describe:

5. Of the following, which best describes you at work? *(please tick one)*

You

☐ manager ☐ employee
☐ foreman ☐ apprentice
☐ self-employed - with employees
☐ self-employed - with no employees

Your partner

☐ manager ☐ employee
☐ foreman ☐ apprentice
☐ self-employed - with employees
☐ self-employed - with no employees

6. Do/did you have any responsibility for other staff held in this post? *(please tick one)*

You

☐ Yes ☐ No

If YES, how many staff?

Please describe: _____

Your partner

☐ Yes ☐ No

If YES, how many staff?

Please describe: _____

Section C: About Your Household

Household income (please tick):

<input type="checkbox"/> Under £10,000	<input type="checkbox"/> £60,000-79,999
<input type="checkbox"/> £10,000-19,999	<input type="checkbox"/> £80,000 and over
<input type="checkbox"/> £20,000-29,999	<input type="checkbox"/> Prefer not to say
<input type="checkbox"/> £30,000-39,999	<input type="checkbox"/> Don't know/not applicable
<input type="checkbox"/> £40,000-59,999	

7. How many people live in your household now? (including yourself)

_____ adults (over 18 years) _____ children (less than 16 years)
 _____ young adults (16-18 years)

8. Please indicate who the adults over 18 are in your household:

- | | | | |
|--------------------------------------|--------------------------|--------------------------------------|--------------------------|
| 1. Yourself | <input type="checkbox"/> | 8. Lodger | <input type="checkbox"/> |
| 2. Your partner | <input type="checkbox"/> | 9. Friend(s) | <input type="checkbox"/> |
| 3. Your parent(s) | <input type="checkbox"/> | 9. Other (<i>please describe</i>): | <input type="checkbox"/> |
| | | _____ | |
| 4. Your partner's parent(s) | <input type="checkbox"/> | | |
| 5. Other relation(s) of yourself | <input type="checkbox"/> | | |
| 6. Other relation(s) of your partner | <input type="checkbox"/> | | |

9. Please indicate how many of the children living with you have:

- | | Number of children |
|---------------------------------------------------------------------------------------------------------------------|---------------------------|
| 1. You and your partner as their biological parents | _____ |
| 2. You as their biological mother (but their biological father is not present) | _____ |
| 3. Neither you nor your partner as biological parents
(Please indicate whether you have adopted, fostered, etc.) | _____ |

13. School contact details: We may like to contact your children's schools and ask their teachers to fill in a questionnaire for us.

Child's Name	School	Teacher's name	Year

Section D: About Your Children

1. Have you explained your child's ASC to their nearest sibling? (please underline)

Yes

No

If yes, at what age and how did you describe the condition?

2. Do you feel that your typical child understands the nature of their sibling's ASC?

(please circle)

Yes

No

3. Do your children attend the same school? (please circle)

Yes

No

4. Does your child who has ASC have any form of remedial therapy in your home?

(please circle)

Yes

No

If yes, please describe briefly what this is, when it was started and how many hours per week are involved:

The End- Thank you for your time!



Booklet 2: About Your Partner:

The following section asks about your partner's personal preferences and is for the adult male living in the house to complete.

Consent Form

I voluntarily agree to take part in KASMS- Kids with ASC; a study with mothers and siblings. I understand that all the information that I will provide in this study will be kept in the strictest confidence and will be used only for research purposes. I am aware that I can choose not to answer any question if I would prefer not to. I understand that I am free to withdraw from the study at any time without providing a reason for doing so.

Father's name:

Father's signature/email address:

Father's date of birth:.....

Researcher: ...Zoë Wheeler...

Researcher's signature/email address: Z.Wheeler@sussex.ac.uk (19/5/08)

Date:

How to fill out the questionnaire

Below is a list of statements. Please read each statement very carefully and rate how strongly you agree or disagree with it by underlining your answer.

Examples

E1. I am willing to take risks.	definitely agree	slightly agree	<u>slightly disagree</u>	definitely disagree
E2. I like playing board games.	definitely agree	<u>slightly agree</u>	slightly disagree	definitely disagree
E3. I find learning to play musical instruments easy.	definitely agree	<u>slightly agree</u>	slightly disagree	definitely disagree
E4. I am fascinated by other cultures.	<u>definitely agree</u>	slightly agree	slightly disagree	definitely disagree

1. I prefer to do things with others rather than on my own.	definitely agree	slightly agree	slightly disagree	definitely disagree
2. I prefer to do things the same way over and over again.	definitely agree	slightly agree	slightly disagree	definitely disagree
3. If I try to imagine something, I find it very easy to create a picture in my mind.	definitely agree	slightly agree	slightly disagree	definitely disagree
4. I frequently get so strongly absorbed in one thing that I lose sight of other things.	definitely agree	slightly agree	slightly disagree	definitely disagree
5. I often notice small sounds when others do not.	definitely agree	slightly agree	slightly disagree	definitely disagree
6. I usually notice car number plates or similar strings of information.	definitely agree	slightly agree	slightly disagree	definitely disagree
7. Other people frequently tell me that what I've said is impolite, even though I think it is polite.	definitely agree	slightly agree	slightly disagree	definitely disagree
8. When I'm reading a story, I can easily imagine what the characters might look like.	definitely agree	slightly agree	slightly disagree	definitely disagree
9. I am fascinated by dates.	definitely agree	slightly agree	slightly disagree	definitely disagree
10. In a social group, I can easily keep track of several different people's conversations.	definitely agree	slightly agree	slightly disagree	definitely disagree
11. I find social situations easy.	definitely agree	slightly agree	slightly disagree	definitely disagree
12. I tend to notice details that others do not.	definitely agree	slightly agree	slightly disagree	definitely disagree
13. I would rather go to a library than a party.	definitely agree	slightly agree	slightly disagree	definitely disagree

14. I find making up stories easy.	definitely agree	slightly agree	slightly disagree	definitely disagree
15. I find myself drawn more strongly to people than to things.	definitely agree	slightly agree	slightly disagree	definitely disagree
16. I tend to have very strong interests which I get upset about if I can't pursue.	definitely agree	slightly agree	slightly disagree	definitely disagree
17. I enjoy social chit-chat.	definitely agree	slightly agree	slightly disagree	definitely disagree
18. When I talk, it isn't always easy for others to get a word in edgeways.	definitely agree	slightly agree	slightly disagree	definitely disagree
19. I am fascinated by numbers.	definitely agree	slightly agree	slightly disagree	definitely disagree
20. When I'm reading a story, I find it difficult to work out the characters' intentions.	definitely agree	slightly agree	slightly disagree	definitely disagree
21. I don't particularly enjoy reading fiction.	definitely agree	slightly agree	slightly disagree	definitely disagree
22. I find it hard to make new friends.	definitely agree	slightly agree	slightly disagree	definitely disagree
23. I notice patterns in things all the time.	definitely agree	slightly agree	slightly disagree	definitely disagree
24. I would rather go to the theatre than a museum.	definitely agree	slightly agree	slightly disagree	definitely disagree
25. It does not upset me if my daily routine is disturbed.	definitely agree	slightly agree	slightly disagree	definitely disagree
26. I frequently find that I don't know how to keep a conversation going.	definitely agree	slightly agree	slightly disagree	definitely disagree
27. I find it easy to "read between the lines" when someone is talking to me.	definitely agree	slightly agree	slightly disagree	definitely disagree
28. I usually concentrate more on the whole picture, rather than the small details.	definitely agree	slightly agree	slightly disagree	definitely disagree
29. I am not very good at remembering phone numbers.	definitely agree	slightly agree	slightly disagree	definitely disagree
30. I don't usually notice small changes in a situation, or a person's appearance.	definitely agree	slightly agree	slightly disagree	definitely disagree
31. I know how to tell if someone listening to me is getting bored.	definitely agree	slightly agree	slightly disagree	definitely disagree
32. I find it easy to do more than one thing at once.	definitely agree	slightly agree	slightly disagree	definitely disagree

33. When I talk on the phone, I'm not sure when it's my turn to speak.	definitely agree	slightly agree	slightly disagree	definitely disagree
34. I enjoy doing things spontaneously.	definitely agree	slightly agree	slightly disagree	definitely disagree
35. I am often the last to understand the point of a joke.	definitely agree	slightly agree	slightly disagree	definitely disagree
36. I find it easy to work out what someone is thinking or feeling just by looking at their face.	definitely agree	slightly agree	slightly disagree	definitely disagree
37. If there is an interruption, I can switch back to what I was doing very quickly.	definitely agree	slightly agree	slightly disagree	definitely disagree
38. I am good at social chit-chat.	definitely agree	slightly agree	slightly disagree	definitely disagree
39. People often tell me that I keep going on and on about the same thing.	definitely agree	slightly agree	slightly disagree	definitely disagree
40. When I was young, I used to enjoy playing games involving pretending with other children.	definitely agree	slightly agree	slightly disagree	definitely disagree
41. I like to collect information about categories of things (e.g. types of car, types of bird, types of train, types of plant, etc.).	definitely agree	slightly agree	slightly disagree	definitely disagree
42. I find it difficult to imagine what it would be like to be someone else.	definitely agree	slightly agree	slightly disagree	definitely disagree
43. I like to plan any activities I participate in carefully.	definitely agree	slightly agree	slightly disagree	definitely disagree
44. I enjoy social occasions.	definitely agree	slightly agree	slightly disagree	definitely disagree
45. I find it difficult to work out people's intentions.	definitely agree	slightly agree	slightly disagree	definitely disagree
46. New situations make me anxious.	definitely agree	slightly agree	slightly disagree	definitely disagree
47. I enjoy meeting new people.	definitely agree	slightly agree	slightly disagree	definitely disagree
48. I am a good diplomat.	definitely agree	slightly agree	slightly disagree	definitely disagree
49. I am not very good at remembering people's date of birth.	definitely agree	slightly agree	slightly disagree	definitely disagree
50. I find it very easy to play games with children that involve pretending.	definitely agree	slightly agree	slightly disagree	definitely disagree

This is the end of the questionnaire-
Thank you for your time!

Study 3 Questionnaire

PART 1:

This questionnaire is about your preferences and behaviours in terms of empathising and systematising and your relationship with ONE of your siblings. Part 1 is about your current relationship with a sibling, Part 2 is about YOU, and Part 3 is retrospective and asks about your relationship (with the SAME sibling from Part 1) when you were aged roughly 8 years old and growing up together.

Please only take part if you have a sibling.

All questionnaires are confidential. The data obtained is coded by numbers and cannot be traced back to you or your sibling. Your participation is voluntary and you have the right to withdraw from the study at any time. By completing this questionnaire you are agreeing to take part.

Initials:..... Sex:.....

Initials of sibling closest in age:.....

Date of birth:..... Today's Date:.....

Ethnicity:

First language:

PART 2

This section of the questionnaire is concerned with your preferences and behaviours.

How to fill out the questionnaire

Below are a list of statements. Please read each statement very carefully and rate how strongly you agree or disagree with it by circling your answer.

DO NOT MISS ANY STATEMENT OUT.

Examples

E1. I am willing to take risks.	definitely agree	slightly agree	<u>slightly disagree</u>	definitely disagree
E2. I like playing board games.	definitely agree	<u>slightly agree</u>	slightly disagree	definitely disagree
E3. I find learning to play musical instruments easy.	definitely agree	slightly agree	slightly disagree	<u>definitely disagree</u>
E4. I am fascinated by other cultures.	<u>definitely agree</u>	slightly agree	slightly disagree	<u>definitely disagree</u>

1. I prefer to do things with others rather than on my own.	definitely agree	slightly agree	slightly disagree	definitely disagree
2. I prefer to do things the same way over and over again.	definitely agree	slightly agree	slightly disagree	definitely disagree
3. If I try to imagine something, I find it very easy to create a picture in my mind.	definitely agree	slightly agree	slightly disagree	definitely disagree
4. I frequently get so strongly absorbed in one thing that I lose sight of other things.	definitely agree	slightly agree	slightly disagree	definitely disagree
5. I often notice small sounds when others do not.	definitely agree	slightly agree	slightly disagree	definitely disagree
6. I usually notice car number plates or similar strings of information.	definitely agree	slightly agree	slightly disagree	definitely disagree
7. Other people frequently tell me that what I've said is impolite, even though I think it is polite.	definitely agree	slightly agree	slightly disagree	definitely disagree
8. When I'm reading a story, I can easily imagine what the characters might look like.	definitely agree	slightly agree	slightly disagree	definitely disagree
9. I am fascinated by dates.	definitely agree	slightly agree	slightly disagree	definitely disagree
10. In a social group, I can easily keep track of several different people's conversations.	definitely agree	slightly agree	slightly disagree	definitely disagree
11. I find social situations easy.	definitely agree	slightly agree	slightly disagree	definitely disagree
12. I tend to notice details that others do not.	definitely agree	slightly agree	slightly disagree	definitely disagree

13. I would rather go to a library than a party.	definitely agree	slightly agree	slightly disagree	definitely disagree
14. I find making up stories easy.	definitely agree	slightly agree	slightly disagree	definitely disagree
15. I find myself drawn more strongly to people than to things.	definitely agree	slightly agree	slightly disagree	definitely disagree
16. I tend to have very strong interests which I get upset about if I can't pursue.	definitely agree	slightly agree	slightly disagree	definitely disagree
17. I enjoy social chit-chat.	definitely agree	slightly agree	slightly disagree	definitely disagree
18. When I talk, it isn't always easy for others to get a word in edgeways.	definitely agree	slightly agree	slightly disagree	definitely disagree
19. I am fascinated by numbers.	definitely agree	slightly agree	slightly disagree	definitely disagree
20. When I'm reading a story, I find it difficult to work out the characters' intentions.	definitely agree	slightly agree	slightly disagree	definitely disagree
21. I don't particularly enjoy reading fiction.	definitely agree	slightly agree	slightly disagree	definitely disagree
22. I find it hard to make new friends.	definitely agree	slightly agree	slightly disagree	definitely disagree
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24. I would rather go to the theatre than a museum.	definitely agree	slightly agree	slightly disagree	definitely disagree
25. It does not upset me if my daily routine is disturbed.	definitely agree	slightly agree	slightly disagree	definitely disagree
26. I frequently find that I don't know how to keep a conversation going.	definitely agree	slightly agree	slightly disagree	definitely disagree
27. I find it easy to "read between the lines" when someone is talking to me.	definitely agree	slightly agree	slightly disagree	definitely disagree
28. I usually concentrate more on the whole picture, rather than the small details.	definitely agree	slightly agree	slightly disagree	definitely disagree
29. I am not very good at remembering phone numbers.	definitely agree	slightly agree	slightly disagree	definitely disagree
30. I don't usually notice small changes in a situation, or a person's appearance.	definitely agree	slightly agree	slightly disagree	definitely disagree
31. I know how to tell if someone listening to me is getting bored.	definitely agree	slightly agree	slightly disagree	definitely disagree

32. I find it easy to do more than one thing at once.	definitely agree	slightly agree	slightly disagree	definitely disagree
33. When I talk on the phone, I'm not sure when it's my turn to speak.	definitely agree	slightly agree	slightly disagree	definitely disagree
34. I enjoy doing things spontaneously.	definitely agree	slightly agree	slightly disagree	definitely disagree
35. I am often the last to understand the point of a joke.	definitely agree	slightly agree	slightly disagree	definitely disagree
36. I find it easy to work out what someone is thinking or feeling just by looking at their face.	definitely agree	slightly agree	slightly disagree	definitely disagree
37. If there is an interruption, I can switch back to what I was doing very quickly.	definitely agree	slightly agree	slightly disagree	definitely disagree
38. I am good at social chit-chat.	definitely agree	slightly agree	slightly disagree	definitely disagree
39. People often tell me that I keep going on and on about the same thing.	definitely agree	slightly agree	slightly disagree	definitely disagree
40. When I was young, I used to enjoy playing games involving pretending with other children.	definitely agree	slightly agree	slightly disagree	definitely disagree
41. I like to collect information about categories of things (e.g. types of car, types of bird, types of train, types of plant, etc.).	definitely agree	slightly agree	slightly disagree	definitely disagree
42. I find it difficult to imagine what it would be like to be someone else.	definitely agree	slightly agree	slightly disagree	definitely disagree
43. I like to plan any activities I participate in carefully.	definitely agree	slightly agree	slightly disagree	definitely disagree
44. I enjoy social occasions.	definitely agree	slightly agree	slightly disagree	definitely disagree
45. I find it difficult to work out people's intentions.	definitely agree	slightly agree	slightly disagree	definitely disagree
46. New situations make me anxious.	definitely agree	slightly agree	slightly disagree	definitely disagree
47. I enjoy meeting new people.	definitely agree	slightly agree	slightly disagree	definitely disagree
48. I am a good diplomat.	definitely agree	slightly agree	slightly disagree	definitely disagree
49. I am not very good at remembering people's date of birth.	definitely agree	slightly agree	slightly disagree	definitely disagree
50. I find it very easy to play games with children that involve pretending.	definitely agree	slightly agree	slightly disagree	definitely disagree

PART 3

This section of the questionnaire is **RETROSPECTIVE** and asks about you and your sibling's relationship with each other at a time when you were *both* in primary school (i.e. aged between 6 & 11 years). If there is a larger age gap than this, please note it on the line below, and consider a time when you were about 8 years old. Please think back to this time (on average) and respond only about the sibling you answered the previous section about. Circle the appropriate response.

Please state the age you were at the time have chosen to think about: _____

Please state your sibling's age at this time you are thinking about: _____

1. Companionship

Some brothers and sisters spend a lot of time together, whereas others have very different interests and aren't together very much. Being together can be when you were both in the same room but not necessarily playing together (e.g., mealtimes, watching television).

During the week how often were you two children together?

Almost never (few minutes in morning and evening each day)	Hardly ever (10-15 minutes in morning and evening each day)	Somewhat (an hour or two each day)	Pretty often (3 or 4 hours each day)	Quite a bit (good part of the each day)	Just about all the time (most of each day)
0	1	2	3	4	5

2. Playing Together

Out of the time you spent together, how often did you play together?

(e.g., interacting with each other around a shared activity, rather than watching TV or eating a meal together)

Almost never (less than 5% of time together)	Hardly ever (about 10% of time together)	Occasionally (about a fifth of time together)	Sometimes (about a third or more of time together)	Pretty often (at least half of time together)	Regularly (almost all of time together, 75-100%)
0	1	2	3	4	5

3. Pretend Play

How often did you play make-believe games together? (e.g., playing doctors and nurses, monsters, spacemen, superman, mother and babies)

Almost never (less than 5% of time together)	Hardly ever (about 10% of time together)	Occasionally (about a fifth of time together)	Sometimes (about a third or more of time together)	Pretty often (at least half of time together)	Regularly (almost all of time together, 75-100%)
0	1	2	3	4	5

4. Quarrels

Most brothers and sisters argue and quarrel. How often did you squabble when you were together?

Almost never (less than 5% of time together)	Hardly ever (about 10% of time together)	Occasionally (about a fifth of time together)	Sometimes (about a third or more of time together)	Pretty often (at least half of time together)	Regularly (almost all of time together, 75-100%)
0	1	2	3	4	5

5. Wanting to Play Together

How often were you interested in playing together?

	Almost never (less than 5% of time together)	Hardly ever (about 10% of time together)	Occasionally (about a fifth of time together)	Sometimes (about a third of time together)	Pretty often (at least half of time together)	Regularly (almost all of time together, 75-100%)
YOU	0	1	2	3	4	5
YOUR SIBLING	0	1	2	3	4	5

6. Affection

How often did you show affection for each other on a day-to-day basis? (e.g., being affectionate in play, being pleased to see each other if separated at school)?

	Almost never (less than 5% of time together)	Hardly ever (about 10% of time together)	Occasionally (about a fifth of time together)	Sometimes (about a third of time together)	Pretty often (at least half of time together)	Regularly (almost all of time together, 75-100%)
YOU	0	1	2	3	4	5
YOUR SIBLING	0	1	2	3	4	5

7. Comforting Each Other

a. If one of you was hurt or upset, how often did you each show concern at the other's distress if one of you did not cause the distress?

	Almost never (less than 5% of time together)	Hardly ever (about 10% of time together)	Occasionally (about a fifth of time together)	Sometimes (about a third of time together)	Pretty often (at least half of time together)	Regularly (almost all of time together, 75-100%)
YOU	0	1	2	3	4	5
YOUR SIBLING	0	1	2	3	4	5

c. How often did you show concern at the other's distress if one of you WAS the cause of distress?

	Almost never (less than 5% of time together)	Hardly ever (about 10% of time together)	Occasionally (about a fifth of time together)	Sometimes (about a third of time together)	Pretty often (at least half of time together)	Regularly (almost all of time together, 75-100%)
YOU	0	1	2	3	4	5
YOUR SIBLING	0	1	2	3	4	5

8. Teaching and Helping Each Other

How often did you spontaneously teach or help each other? (e.g., if one needed help with a chore or working something out)?

	Almost never (less than 5% of time together)	Hardly ever (about 10% of time together)	Occasionally (about a fifth of time together)	Sometimes (about a third of time together)	Pretty often (at least half of time together)	Regularly (almost all of time together, 75-100%)
YOU	0	1	2	3	4	5
YOUR SIBLING	0	1	2	3	4	5

9. Caretaking and Being Taken Care Of

How willing was each of you to take care of the other? (e.g., how willing would one of you be to help out, and how willing would the other be to go along)?

	Not willing (always or almost always refused to do so)	Very unwilling (generally refused to do so)	Occasionally willing (usually complained but did it)	Sometimes willing (sometimes resistant)	Usually willing (generally no complaints)	Always willing (hardly ever complained)
YOU	0	1	2	3	4	5
YOUR SIBLING	0	1	2	3	4	5

10. Physical Fights

How often did your quarrels turn into hitting one another?

	Almost never (less than 5% of time together)	Hardly ever (about 10% of time together)	Occasionally (about a fifth of time together)	Sometimes (about a third of time together)	Pretty often (at least half of time together)	Regularly (almost all of time together, 75-100%)
YOU	0	1	2	3	4	5
YOUR SIBLING	0	1	2	3	4	5

11. Sharing

How much did you share your possessions?

	Almost never	Rarely	Shared only a few things	Shared some things (but minded about a few special things)	Shared most things (but occasionally refused to share something special)	Shared just about anything
YOU	0	1	2	3	4	5
YOUR SIBLING	0	1	2	3	4	5

12. Competing with each other

How often did you make competitive remarks or act competitively?

(e.g., if one had just done something, did the other insist on showing that they could do it too, or better)?

	Almost never (once a month or less)	Hardly ever (less than once a week)	Occasionally (about once a week)	Sometimes (couple of times a week)	Pretty often (several times a week)	Regularly (just about every day)
YOU	0	1	2	3	4	5
YOUR SIBLING	0	1	2	3	4	5

13. Jealousy and Rivalry

Most children feel jealous at times of the attention and affection their brothers and sisters receive from their parents.

How often did each of you appear jealous?

(e.g., by interrupting/disrupting the game your mum or dad was playing with the other one of you, or by being naughty).

	Almost never (once a month or less)	Hardly ever (less than once a week)	Occasionally (about once a week)	Sometimes (couple of times a week)	Pretty often (several times a week)	Regularly (just about every day)
YOU	0	1	2	3	4	5
YOUR SIBLING	0	1	2	3	4	5

Thank you for taking part, this is the end of the questionnaire!

As this is a study of SIBLING relationships, we would like to ask your sibling (whom you answered this and the first section of the questionnaire about) to complete the same booklet. We will give you an envelope so that you can post or pass on to them one of these questionnaires (a reply paid envelope for them to return the questionnaire to us is included in the packet). They can then choose whether to take part. Please write the name and contact address of this sibling on the front of the stamped envelope. Yours and your sibling's responses are confidential and will not be shown to each other.

Do you agree to sending/passing on a copy of this questionnaire to your sibling?

(please circle) YES

NO

Instructions and Basic Information

This questionnaire is concerned with your relationship with one of your siblings. Each question asks you to rate how much different behaviors and feelings occur in your relationship. Try and answer each question as quickly and accurately as you can. Try and answer the questions as your relationship is now, not how it was in the past, nor how you think it might be in the future. In the remainder of the questionnaire, whenever you see THIS SIBLING or YOUR SIBLING we are talking about the specific sibling you are completing the study about. We begin by asking you some general questions about your sibling and yourself. Please circle, check, or fill in the correct response.

1a) Your age: _____	1b) This sibling's age: _____
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2a) Your gender: Male Female	2b) This sibling's gender: Male Female
--------------------------------------	------------------------------------------------

3a) Your birth order:	1 = firstborn, 2 = secondborn, 3 = thirdborn, 4 fourthborn, 5 = laterborn
-----------------------	---------------------------------------------------------------------------

3b) This sibling's birth order:	1 = firstborn, 2 = secondborn, 3 = thirdborn, 4 fourthborn, 5 = laterborn
---------------------------------	---------------------------------------------------------------------------

How far does this sibling live from you? (circle the correct response)

1) same city	4) between 200 and 500 miles
2) different city, less than 100 miles	5) between 500 and 1000 miles
3) between 100 & 200 miles	6) more than 1,000 miles

How much do you and this sibling see each other?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

How much does this sibling phone you?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

How much do you phone this sibling?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

How much do you and this sibling see each other for holidays and family gatherings?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

What is your relationship to this sibling?

1) biological sibling	2) twin	3) step sibling
4) half sibling	5) other (please explain) _____	

Now we would like some information about your other siblings **DO NOT INCLUDE THIS SIBLING HERE**

Age	Gender	Relationship (bio, step, twin)	Age	Gender	Relationship (bio, step, twin)
Sib #1: _____	M F	_____	Sib #2: _____	M F	_____
Sib #3: _____	M F	_____	Sib #4: _____	M F	_____
Sib #5: _____	M F	_____	Sib #6: _____	M F	_____
Sib #7: _____	M F	_____	Sib #8: _____	M F	_____

Turn the page and begin the Adult Sibling Relationship Questionnaire

1) How much do you and this sibling have in common?

☐ 1 Hardly Anything ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

2) How much do you talk to this sibling about things that are important to you?

☐ 1 Hardly Anything ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

3) How much does this sibling talk to you about things that are important to him or her?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

4) How much do you and this sibling argue with each other?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

5) How much does this sibling think of you as a good friend?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

6) How much do you think of this sibling as a good friend?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

7) How much do you irritate this sibling?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

8) How much does this sibling irritate you?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

9) How much does this sibling admire you?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

10) How much do you admire this sibling?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

11) Do you think your mother favors you or this sibling more?

- ☐ 1 I am usually favored
☐ 2 I am sometimes favored
☐ 3 Neither of us is favored
☐ 4 This sibling is sometimes favored
☐ 5 This sibling is usually favored
-

12) Does this sibling think your mother favors him/her or you more?

- ☐ 1 I am usually favored
☐ 2 I am sometimes favored
☐ 3 Neither of us is favored
☐ 4 This sibling is sometimes favored
☐ 5 This sibling is usually favored
-

13) How much does this sibling try to cheer you up when you are feeling down?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

14) How much do you try to cheer this sibling up when he or she is feeling down?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

15) How competitive are you with this sibling?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

16) How competitive is this sibling with you?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

17) How much does this sibling go to you for help with non-personal problems?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

18) How much do you go to this sibling for help with non-personal problems?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

19) How much do you dominate this sibling?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

20) How much does this sibling dominate you?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

21) How much does this sibling accept your personality?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

22) How much do you accept this sibling's personality?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

23) Do you think your father favors you or this sibling more?

- ☐ 1 I am usually favored
 - ☐ 2 I am sometimes favored
 - ☐ 3 Neither of us is favored
 - ☐ 4 This sibling is sometimes favored
 - ☐ 5 This sibling is usually favored
-

24) Does this sibling think your father favors him/her or you more?

- ☐ 1 I am usually favored
 - ☐ 2 I am sometimes favored
 - ☐ 3 Neither of us is favored
 - ☐ 4 This sibling is sometimes favored
 - ☐ 5 This sibling is usually favored
-

25) How much does this sibling know about you?

☐ 1 Hardly Anything ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

26) How much do you know about this sibling?

☐ 1 Hardly Anything ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

7) How much do you and this sibling have similar personalities?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

28) How much do you discuss your feelings or personal issues with this sibling?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

29) How much does this sibling discuss his or her feelings or personal issues with you?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

30) How often does this sibling criticize you?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

31) How often do you criticize this sibling?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

32) How close do you feel to this sibling?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

33) How close does this sibling feel to you?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

34) How often does this sibling do things to make you mad?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

35) How often do you do things to make this sibling mad?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

36) How much do you think that this sibling has accomplished a great deal in life?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

37) How much does this sibling think that you have accomplished a great deal in life?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

38) Does this sibling think your mother supports him/her or you more?

- ☐ 1 I usually get more support
☐ 2 I sometimes get more support
☐ 3 We are supported equally
☐ 4 This sibling sometimes gets more support
☐ 5 This sibling usually gets more support
-

39) Do you think your mother supports you or this sibling more?

- ☐ 1 I usually get more support
☐ 2 I sometimes get more support
☐ 3 We are supported equally
☐ 4 This sibling sometimes gets more support
☐ 5 This sibling usually gets more support
-

40) How much can you count on this sibling to be supportive when you are feeling stressed?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

41) How much can this sibling count on you to be supportive when he or she is feeling stressed?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

42) How much does this sibling feel jealous of you?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

43) How much do you feel jealous of this sibling?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

44) How much do you give this sibling practical advice? (e.g. household or car advice)

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

45) How much does this sibling give you practical advice?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

46) How much is this sibling bossy with you?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

47) How much are you bossy with this sibling?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

48) How much do you accept this sibling's lifestyle?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

49) How much does this sibling accept your lifestyle?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

50) Does this sibling think your father supports him/her or you more?

- ☐ 1 I usually get more support
☐ 2 I sometimes get more support
☐ 3 We are supported equally
☐ 4 This sibling sometimes gets more support
☐ 5 This sibling usually gets more support
-

51) Do you think your father supports you or this sibling more?

- ☐ 1 I usually get more support
☐ 2 I sometimes get more support
☐ 3 We are supported equally
☐ 4 This sibling sometimes gets more support
☐ 5 This sibling usually gets more support
-

52) How much do you know about this sibling's relationships?

☐ 1 Hardly Anything ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

53) How much does this sibling know about your relationships?

☐ 1 Hardly Anything ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

54) How much do you and this sibling think alike?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

55) How much do you really understand this sibling?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

56) How much does this sibling really understand you?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

57) How much does this sibling disagree with you about things?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

58) How much do you disagree with this sibling about things?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

59) How much do you let this sibling know you care about him or her?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

60) How much does this sibling let you know he or she cares about you?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

61) How much does this sibling put you down?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

62) How much do you put this sibling down?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

63) How much do you feel proud of this sibling?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

64) How much does this sibling feel proud of you?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

65) Does this sibling think your mother is closer to him/her or you?

- ☐ 1 Our mother is usually closer to me
☐ 2 Our mother is sometimes closer to me
☐ 3 Our mother is equally close to both of us
☐ 4 Our mother is sometimes closer to this sibling
☐ 5 Our mother is usually closer to this sibling
-

66) Do you think your mother is closer to you or this sibling?

- ☐ 1 Our mother is usually closer to me
☐ 2 Our mother is sometimes closer to me
☐ 3 Our mother is equally close to both of us
☐ 4 Our mother is sometimes closer to this sibling
☐ 5 Our mother is usually closer to this sibling
-

67) How much do you discuss important personal decisions with this sibling?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

68) How much does this sibling discuss important personal decisions with you?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

69) How much does this sibling try to perform better than you?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

70) How much do you try to perform better than this sibling?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

71) How likely is it you would go to this sibling if you needed financial assistance?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

72) How likely is it this sibling would go to you if he or she needed financial assistance?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

73) How much does this sibling act in superior ways to you?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

74) How much do you act in superior ways to this sibling?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

75) How much do you accept this sibling's ideas?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

76) How much does this sibling accept your ideas?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

77) Does this sibling think your father is closer to him/her or you?

- ☐ 1 Our father is usually closer to me
☐ 2 Our father is sometimes closer to me
☐ 3 Our father is equally close to both of us
☐ 4 Our father is sometimes closer to this sibling
☐ 5 Our father is usually closer to this sibling
-

78) Do you think your father is closer to you or this sibling?

- ☐ 1 Our father is usually closer to me
☐ 2 Our father is sometimes closer to me
☐ 3 Our father is equally close to both of us
☐ 4 Our father is sometimes closer to this sibling
☐ 5 Our father is usually closer to this sibling
-

79) How much do you know about this sibling's ideas?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

80) How much does this sibling know about your ideas?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much

81) How much do you and this sibling lead similar lifestyles?

☐ 1 Hardly At All ☐ 2 A Little ☐ 3 Somewhat ☐ 4 Very Much ☐ 5 Extremely Much
